FEBRUARY 1966 35 CENTS

Popular Science

MONTHLY

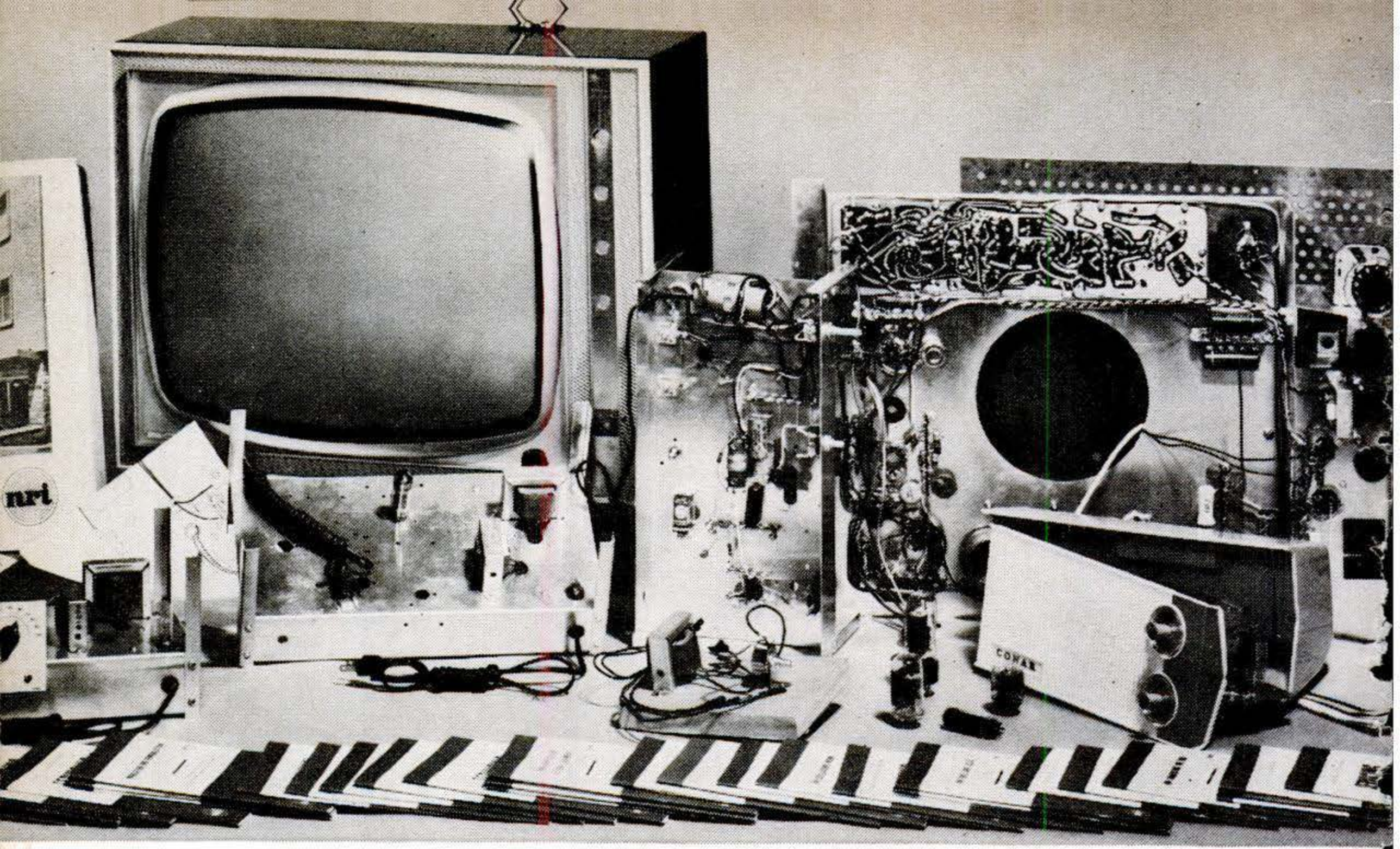
WHEEL-ALIGNMENT BUNK
Are You Wasting Money Up Front?

BOATING '66
20 Colorful, Exciting Pages

NEW! TINY STEAM AUTO ENGINE

SMOTHERS BROTHERS—Crazy for Wheels!

HOW TO COLOR METAL CHEMICALLY



COMPARE. You'll find—as have tens of thousands of NRI graduates—that NRI training gives you more value. From the delivery of your first lessons in the remarkable NRI Achievement Kit we send you on enrolling, to "bite size" easily-read texts carefully programmed with custom-designed training kits . . . NRI can't be beat. Text for text, kit for kit, dollar for dollar —your best home-study buy is unquestionably NRI. (And NRI training costs you less than one semester's tuition at most colleges.)

New Achievement Kit Starts You Fast

The day we receive your enrollment application we mail out your new NRI Achievement Kit. This attractive starter kit is an outstanding, logical way to help you get an easier, faster start in the training of your choice. It is the first of a number of special training aids developed in the NRI laboratories to make your adventure into Electronics exciting, meaningful. What's in it? Your first group of lesson texts; a rich, vinyl desk folder to hold your material; the industry's most complete Radio-TV Electronics Dictionary; valuable reference texts; lesson answer sheets; envelopes; pencils; pen; engineer's ruler; even postage. No other school has anything like it.

Build, Discover with NRI Equipment

Electronics comes alive with NRI training kits. What better way to learn than by *doing?* NRI pioneered and perfected the "home lab" technique of training at home in spare time. You get your hands on actual parts to build, experiment, explore, discover. NRI invites comparison with training equipment offered by any other school. Begin *now* this exciting program of practical learning. Whatever your need . . . whatever your education . . . there's an NRI instruction plan for you, at low tuition rates. Get all the facts. Fill in and mail the postage-free card today. NATIONAL RADIO INSTITUTE, Electronics Division, Washington, D. C. 20016

NOW 10 WAYS to Train at Home with the Leader

1. TELEVISION-RADIO SERVICING —Learn to fix black-and-white and color sets, AM-FM radios, stereo hi-fi, etc. A profitable field for part or full-time business of your own.

2. COMPLETE COMMUNICATIONS* —Teaches and gives actual practice in operation, service, maintenance of AM, FM, and TV broadcasting stations. Also covers marine, aviation, mobile radio, facsimile, microwave, radar.

3. INDUSTRIAL-MILITARY ELECTRONICS—From basic principles to computers. A comprehensive training plan that starts with fundamentals, then covers servos, telemetry, multiplexing, phase circuitry, other subjects.

4. FCC LICENSE*—Specifically designed to prepare you for First Class FCC Radiotelephone License exams. You begin with Electronic fundamentals, advance to required subjects covering equipment, procedures.

5. MATH FOR ELECTRONICS—A brief course for engineers and technicians who need a quick review of math used in industry, communications, government jobs. Short-cut formulas, digital number systems, much more.

6. BASIC ELECTRONICS — Concise course in modern Electronic terminology and components. Practical, useful information to help you understand the field, give you some technical knowledge of Radio-TV, Electronics.

7. AVIATION COMMUNICATIONS* —Prepares you to install, maintain, service aircraft equipment like direction finders, ranges, markers, Loran, Shoran, Radar, landing systems. Prepares you for FCC License exams.

8. MOBILE COMMUNICATIONS*— Learn to install, maintain mobile equipment and associated base stations. Covers transmitters and receivers used by police, fire departments, taxi companies, etc. Prepares for FCC exams.

9. MARINE COMMUNICATIONS*— Covers transmitters, direction finders, depth indicators, Radar, Sonar, other equipment used on commercial ships and pleasure boats. Prepares you for FCC License exams.

10. ELECTRONICS FOR AUTOMATION—Not for beginners, but for men with some fundamental knowledge of Electronics who want an understanding of Automation. Process control, ultrasonics, telemetering and remote control, etc.

***NOTE: You must pass your FCC License exams (any Communications course) or NRI refunds in full the tuition you have paid.**

Copyrighted material

Want big dig, tall top speed and authentic fuel efficiency? Plus a 2-year warranty? Choose from five new Sea-Horse V4's

Start with the new 100hp Sea-Horse Golden Meteor. With its new high-thrust, low-drag lower unit, this most powerful Johnson ever built is a breathtaking performer on any outboard boat.

100hp more than you need? Choose from two new 80hp models (Electramatic and Electric) both with the same new tuned exhaust as the V-100. Or, there are two new, economy V-60's (one high-speed model, one high-thrust for houseboats.) *Fuel economy? Wonderful!* On regular grade fuel! The new V-100, for example, uses no more fuel than 2-cycle outboards of substantially less horsepower—in fact, we'd like you to compare it with *any* 4-cycle outboard, inboard or stern drive. Remember, too, all of these engines use a 50 to 1 gas-oil mix. This not only dramatically lengthens engine life, it saves you enough on oil in one year to pay for your oil the next. In all, there are 16 new models in 10 power classes. For the right engine to fit your boating needs, see your Johnson dealer. He's in the Yellow Pages. P.S. Johnson also makes a full line of Johnson Boats and the new Johnson Skee-Horse snowmobiles.

From 3 to 100hp, every '66 Johnson features:

- **Famous 2-year warranty***
- **Full corrosion protection**
- **50 to 1 gas-oil mix**

***For 24 months after purchase, Johnson Motors will replace, without cost to the original purchaser, any part of its manufacture which upon inspection proves to have failed in normal use due to faulty material or workmanship.**

Johnson Motors, 2165 Pershing Road, Waukegan, Ill. Division Outboard Marine Corporation

first in dependability

Johnson

Copyright Material

Popular Science
REG. U.S. PAT. OFF. MONTHLY
Founded in 1872 FEBRUARY 1966 Vol. 188 No. 2

HIGHLIGHTS OF THIS ISSUE:

Comparing Ford-Chevy-Plymouth Wagons PAGE 75

The low-down on the Big Three station wagons by PS's outspoken auto editor: power, load capacity, handling, and quality.

New Revolver-Like Steam Engine PAGE 84

A steam engine in a sports car? This zany one may yet nestle there.

Color Those Metal Projects Chemically PAGE 124

How to get striking results, simply, with readily available materials.

Special 20-Page Boating Section PAGE 132

Get ready for launching time' Here's the dope on the new boats and accessories, boat camping, marinas Chrysler's new line, the seagoing Wankel.

Wheel-Alignment Bunk PAGE 180

Here's what you should know to make your car safer, better-handling.

COVER PAINTING BY RAY PIOCH

CARS AND DRIVING

75 Comparing Ford-Chevy-Plymouth Wagons
104 Smothers Brothers—Crazy for Wheels
108 Front Drive Gaining Fast in Europe
112 What's New for Your Car
130 License Plates for '66

SPECIAL REPORT

92 Blackout: Can It Happen in Your Town?

SCIENCE AND INVENTIONS

84 New Revolver-Like Steam Engine Produces 4.25 Hp. per Cubic Inch
107 Highway Lookout Is Walk-In Camera
120 New "Firsts" in First Aid

SPACE AND AVIATION

80 Our Fabulous Choppers
90 World's First Supersonic Jet Airport
96 Start and Finish of a Record Flight
98 von Braun: Practicing Moon Landing

ELECTRONICS

114 The PS 9-in-1 Troubleshooter
118 This Gizmo Warns: Icy Roads
119 Laser TV System Sees in the Dark

HOME AND SHOP

113 What's New for Your Home
124 Color Those Metal Projects Chemically
154 How to Live Without an Entrance Hall
158 Build Your Own Home Hobby Center
162 Two Projects: TV Tray and Snack Bar
164 Three Boring Bars You Can Make
166 Woodworking Champ of Any Shop
172 The Toaster You Build Into a Wall
174 How to Install Light Dimmers
179 Wall Rack for Cutting Glass

BOATING: Special 20-Page Section

132 Highlights for '66
138 What's New in Boating
140 Boat Camping Doubles Your Pleasure
144 Chrysler Enters Boating's Big League
147 Instant Mahogany for Boats
148 The Wankel Engine Goes to Sea
150 Dry-Slip Marinas—Kinder to Your Boat

AUTO UPKEEP

180 Wheel-Alignment Bunk . . . Are You Wasting Your Money Up Front?
186 Gus Saves a Friend from a Snow Job
192 Hints from the Model Garage

COMING NEXT MONTH

- **Report from the Driver's Seat.** Jan Norbye tries out the "low-priced" luxury cars (Buick LeSabre, Chrysler Newport, Mercury Montclair) and gives you his usual candid comparison.
- **The F-5: Our Pint-Size Jet.** The story of a remarkable little warplane, now streaking at supersonic speeds across the skies over Vietnam. A third the size—and cost—of an F-105, it's nicknamed the Freedom Fighter.
- **Erle Stanley Gardner,** the famous mystery writer, describes his adventures in pursuing a fascinating hobby—hunting lost mines in the desert wilderness of the American Southwest.
- **How Safe Are Your Tires?** No matter how good a driver you are, your life depends on that rubber between you and the road. Here's what every motorist should know about his tires.
- **How to Install Special Outlets.** The latest in a money-saving series on doing your own wiring.
- **Longer Life for Your Automatic Transmission.** How it works; how to keep it functioning at its best; how to avoid costly repairs.
- **Wood Glazing.** Full-color photos explain this new wood-finishing technique that achieves dramatically beautiful effects.

PHOTOGRAPHY

100 250 Pictures on One Negative!
102 What's New in Photography

SHORT CUTS AND TIPS

161 Holder Aids Darkroom Pouring
214 Vise Grip Makes Good Saw Stop

PICTURE NEWS

89 Water Jets to Speed Navy to 85 m.p.h.
123 Electric Piano Player Fits Keyboard
129 Small-Wheel Bike Folds on Itself

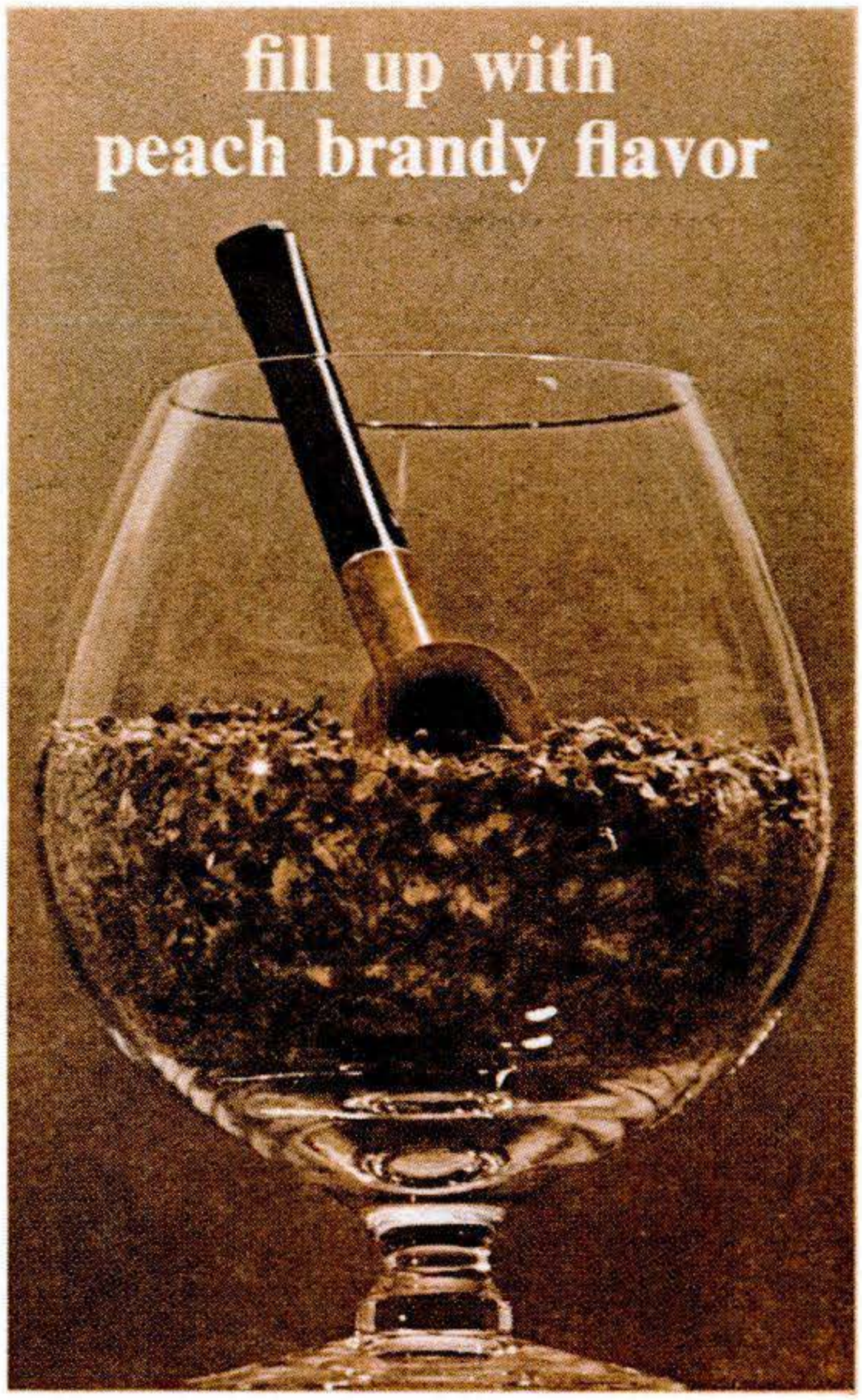
EVERY MONTH

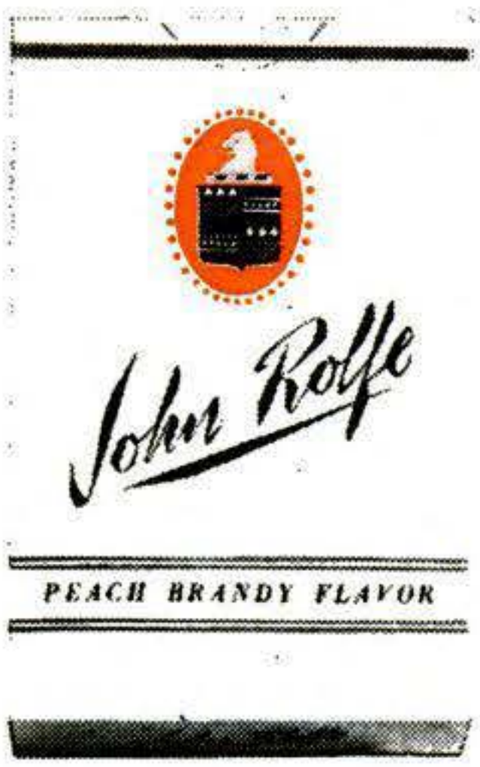
6 PS Readers Talk Back
18 "Say, Smokey—"
27 Science Newsfront
70 Detroit Report
122 I'd Like to See Them Make
152 New Ideas from the Inventors
165 Shop Talk
220 Wordless Workshop

Mechanics and Handicraft ® *Popular Science* ®

COPYRIGHT © 1966 BY POPULAR SCIENCE PUBLISHING CO., INC. ALL RIGHTS RESERVED.

PRINTED IN U.S.A. 24





Here's peach brandy by the pipe bowlful. For new John Rolfe Mixture weds the finest tobaccos with the exclusive flavor and aroma of peach brandy. It's a pleasure breakthrough for smokers and everyone around them. For a free pack, send your name and address to John Rolfe, Dept. S, P.O. Box 3-AC, Richmond, Virginia 23208

FROM THE HOUSE OF Edgeworth

Larus & Brother Company, Inc., Richmond, Va.
Fine Tobacco Products Since 1877

Copyrighted material

ERNEST V. HEYN
Associate Publisher and Editor-in-Chief

HUBERT LUCKETT Executive Editor
KENDALL W. GOODWYN Managing Editor
HARRY SAMUELS Art Director
ROBERT P. STEVENSON Editor, Home and Shop Group

EVERETT H. ORTNER Copy Chief
DEVON FRANCIS Special Assistant to the Editor

SENIOR EDITORS Alden P. Armagnac, Herbert Shuldiner ● AUTOMOTIVE EDITOR Jan P. Norbye
FEATURES EDITOR W. Stevenson Bacon ● PHOTOGRAPHY EDITOR Everett H. Ortner
HOME WORKSHOP EDITOR Charles E. Rhine ● ELECTRONICS EDITOR Ronald M. Benrey ● BOATING EDITOR Jim Roe
WEST COAST EDITOR Wesley S. Griswold ● EUROPEAN EDITOR David Scott
ASSOCIATE EDITORS Frank Dorr, Herbert O. Johansen, Ruth Westphal
ART EDITORS Herbert Anthony, Richard J. Meyer
ART PRODUCTION MANAGER Henry W. Kazmirowski ● ART ASSOCIATE W. David Houser
EDITORIAL ASSISTANTS Ruth Velazco (Chief), Ann Dallas, Claire B. Kelly, Janine Molina, Sandra S. Morehouse, Mary Rose Schneider

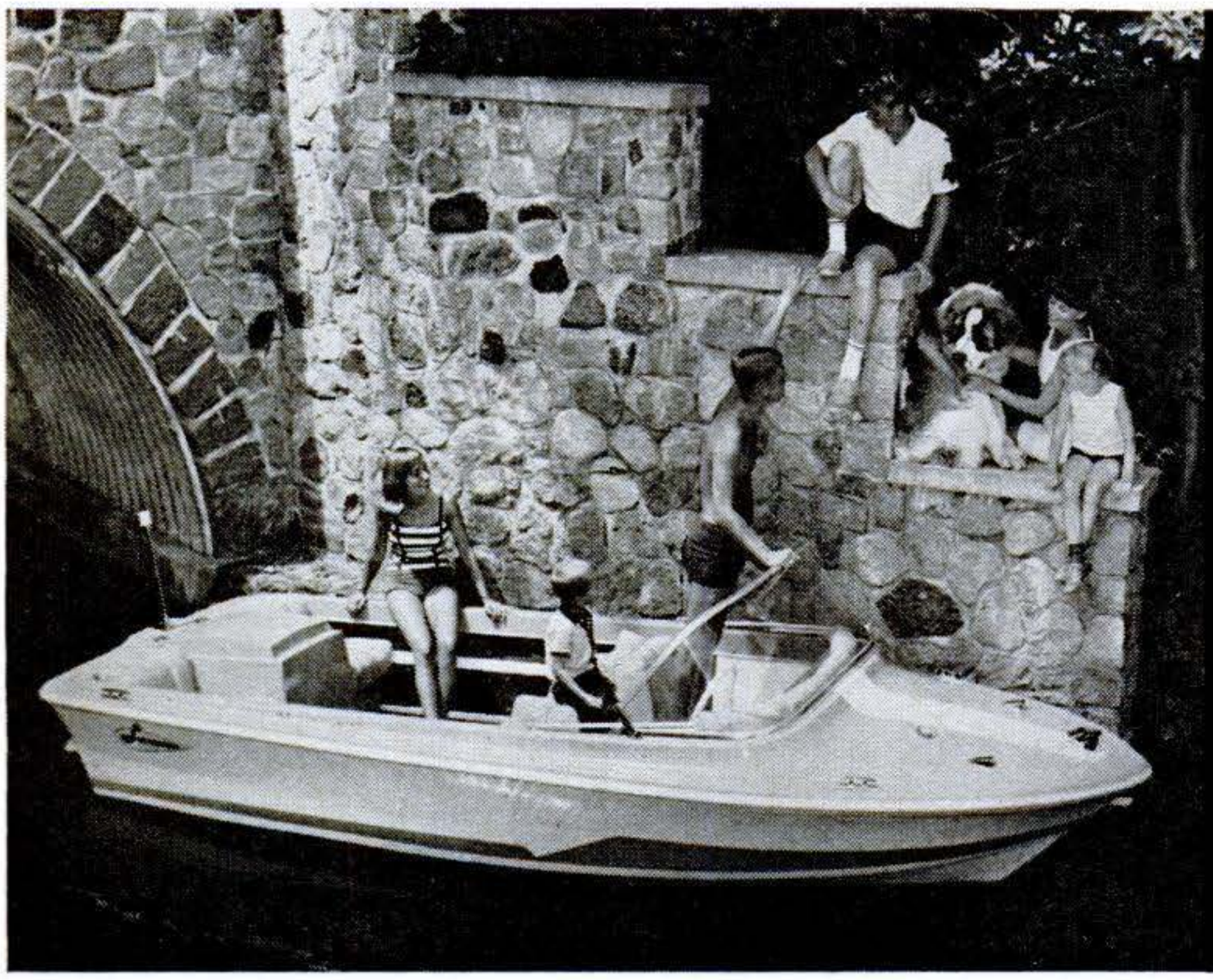
Return postage must accompany all manuscripts submitted. We cannot be responsible for the loss of manuscripts or photos.

E. S. DUFFIELD, President

JOHN R. WHITING Executive Vice-President and Publisher
EUGENE WATSON Executive Vice-President Circulation
CHARLES S. THORN Executive Vice-President Advertising

EDITORIAL OFFICES: 355 Lexington Ave., New York, N. Y. 10017

PUBLISHED MONTHLY by Popular Science Publishing Co., Inc., 355 Lexington Ave., New York, N. Y. 10017
SUBSCRIPTION SERVICE. ***New or renewal orders:*** Send to Popular Science Subscription Department, Boulder, Colo. 80302. One year $4, 2 years $7, 3 years $9 in U.S., its possessions, and Canada. Elsewhere, 1 year $6.50, 2 years $12, 3 years $17. Single copy 35¢. *Subscription orders processed electronically* ● ***All subscription adjustments:*** Write to Robert Harlan, Popular Science, P.O. Box 1083, Boulder, Colo. 80302. For change of address allow six weeks; please give both old and new addresses. Notices of undelivered copies (Form 3579) to Mr. Harlan. ● Second class postage paid at New York, N.Y., and at additional mailing offices. Entered as second class matter at the Post Office Department, Canada. Printed in U.S.A. ● ADVERTISING OFFICES, NEW YORK: 355 Lexington Ave., Tel. 212-687-3000; CHICAGO: 401 N. Michigan Ave., Tel. 312-527-0550; DETROIT: 2909 Book Tower, Tel. 313-962-2863; FORT LAUDERDALE: 317 N. E. 28th St., Tel. 305-564-0163, LOS ANGELES (includes Intermountain States): 8721 Beverly Blvd., Tel. 213-652-8790; SAN FRANCISCO (includes Pacific Northeast): 110 Sutter St., Tel. 415-434-2675.



Are you getting all these features in other brands for $995?

You owe it to yourself ... to compare

No other brand gives you so much value as a Larson. No other brand has a two year Insured-Warranty against fire, theft and damage that saves you $50 to $250 cash. No other brand has convertible top, 18 gallon gas tank and sun-bather seats as standard equipment. No other brand has Larson's "Million Bubble Ride."

We urge you to compare. For example, this 15′ All American 156 Comboard has all the Larson features plus the new 60 hp. Mercruiser for $2545 (outboard version—$995). You get the inboard look with outboard trailerability. This is the best price/value/quality ratio on the market.

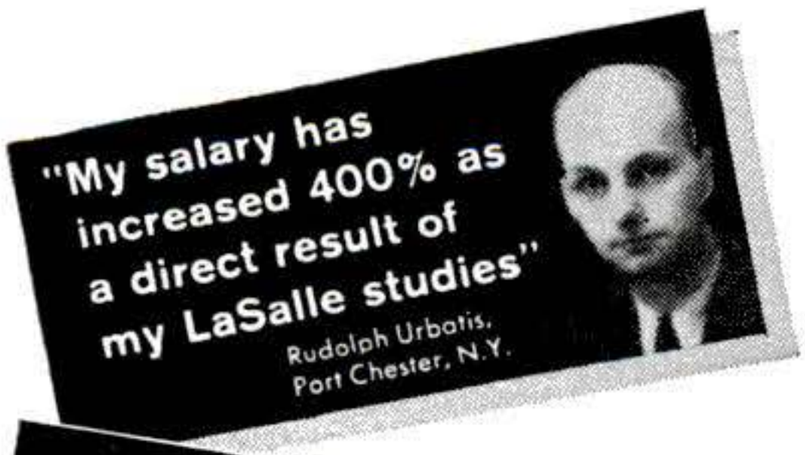
Write for color catalog and Price Comparison Chart of 67 models of twelve major brands

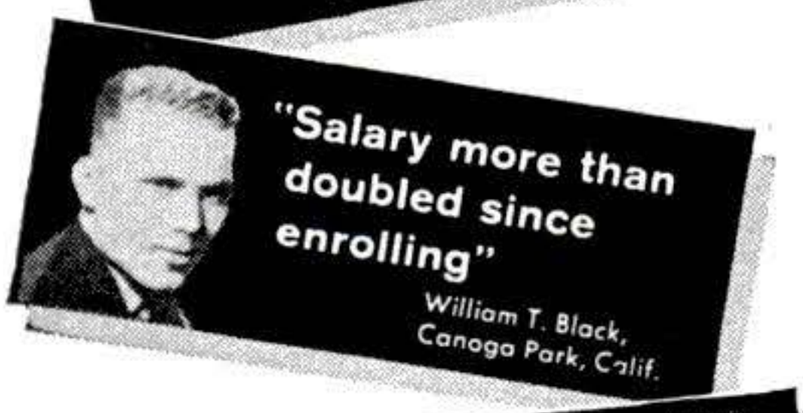
Larson

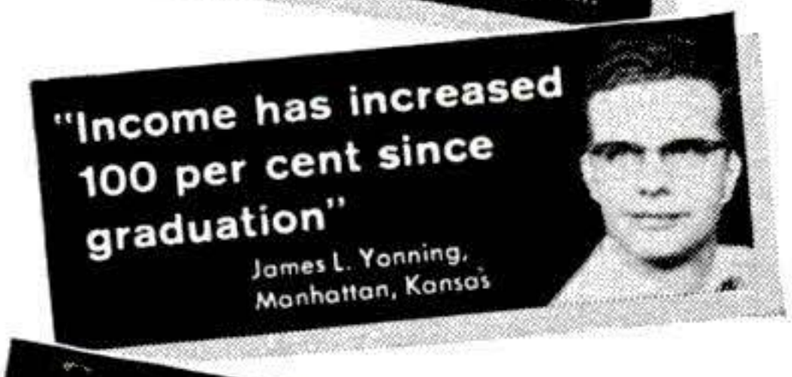
LARSON BOATS
Little Falls, Minn.; Nashville, Ga. and Westfield, Mass.

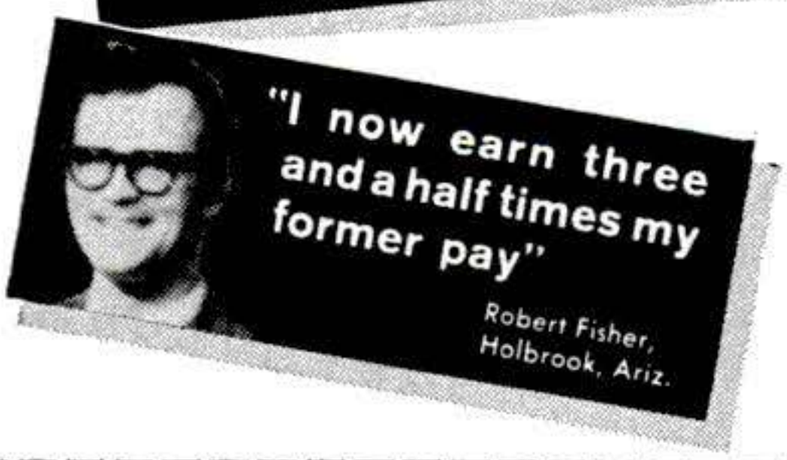
Copyrighted material

WHO ELSE WANTS A BIG RAISE IN PAY?









Stuck in a rut? Tired of your dead-end job? Here's proof you can step up to a high-salary position with prestige and security through LaSalle spare-time training.

JUST LOOK at these enthusiastic reports. Have you ever seen anything like them? They are just a few of many hundreds of similar statements in letters that come from LaSalle students week after week, month after month, year after year.

LaSalle students have one ambition in common — to get out of the ranks of the untrained and earn big money, prestige and security in a key job. Isn't that your goal too?

Without interfering with your present work — and by devoting only a little of your spare time — you too can qualify rapidly for advancement in the field of your choice through LaSalle home study. The cost is surprisingly low.

LaSalle has been an acknowledged leader in home education for more than half a century. It has provided training in business, high school and technical subjects to more than 1,000,000 ambitious men and women. Its distinguished faculty includes some of the country's most outstanding authorities. That is why your LaSalle diploma is recognized and respected by employers.

Check the subject you are interested in — then send the coupon below for FREE booklet. No obligation. Mail to LaSalle, 417 South Dearborn, Chicago, Illinois 60605.

(Confidential — please answer all questions)

LA SALLE EXTENSION UNIVERSITY

A Correspondence Institution • **417 South Dearborn, Dept. 50-105, Chicago, Illinois 60605**

I have answered the questions in this confidential questionnaire. Please send me full information on how I may prepare for a choice position in the field I have checked below.

MY NAME .....

ADDRESS .....

CITY & ZONE ..... STATE .....

COUNTY ..... AGE .....

EDUCATION: *(Fill in number of years completed)*

Grammar School ..... years
High School ..... years
College ..... years
Other ..... years

PRESENT EMPLOYMENT:

Kind of position .....

Hours of work ..... A.M. to ..... P.M.

GENERAL INFORMATION:

☐ Single ☐ Married

Estimated spare hours per week available for study .....

343

ACCOUNTING
- ☐ Complete Accounting with CPA Training
- ☐ Complete Accounting
- ☐ Federal Income Tax
- ☐ Accounting Systems
- ☐ Auditing Procedure
- ☐ Controllership
- ☐ CPA Training
- ☐ Modern Bookkeeping

LAW COURSES
- ☐ Bachelor of Laws Degree
- ☐ Business Law
- ☐ Insurance Law
- ☐ Claim Adjusting Law
- ☐ Law for Police Officers
- ☐ Law for Trust Officers

SALESMANSHIP
- ☐ Sales Training

BUSINESS MANAGEMENT
- ☐ Complete Business Management
- ☐ Credit and Collections
- ☐ Office Management
- ☐ Personnel Management
- ☐ Business Correspondence

STENOTYPE
- ☐ Machine Shorthand

TRAFFIC AND TRANSPORTATION
- ☐ Complete Traffic Management
- ☐ Rate and Tariffs
- ☐ Agency and Services
- ☐ Motor Truck Traffic

DRAFTING
- ☐ Basic Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Architectural Drafting
- ☐ Structural Drafting
- ☐ Aeronautical Drafting

REAL ESTATE
- ☐ Complete Real Estate
- ☐ Real Estate Brokerage
- ☐ Real Estate Management
- ☐ Real Estate Sales

TECHNICAL COURSES
- ☐ Auto Body Repair
- ☐ Refrigeration
- ☐ Air-Conditioning
- ☐ Diesel
- ☐ Welding
- ☐ Motor Tune-up

HIGH SCHOOL
- ☐ High School Diploma
- ☐ Vocational Course

Copyrighted material

PS Readers Talk Back

Want to get something off your chest? Write "Readers Talk Back," POPULAR SCIENCE, 355 Lexington Ave., New York, N.Y. 10017.

Ford on Car Safety

"Henry Ford II Talks About Car Safety" [Dec.] sidesteps one very important issue: speed. As long as car manufacturers insist on putting such high-powered engines in their products, drivers will assume that they must be used to the fullest. It took 50 years for one manufacturer to recognize the value of a side mirror enough to include it as standard equipment. Let more research be expended on preventing accidents and less on softening the blow.

FRANK SMITH, M.I.T., Cambridge, Mass.

. . . How much of that "safety package" bragged about is standard on any American car below the Lincoln level? And how often (if ever) has the automobile industry started talking about safety before getting a strong kick in the seat of the pants from the AAA, Congress, the GSA, etc.?

HARRY V. ELLIS III, Atlanta.

Whopper Choppers

The Sikorsky CH-54A is *not* the biggest helicopter ["Biggest—and Ugliest—Chopper Goes to War," Dec.]. The world's largest is the Russian Mil MI-6 and its crane-type counterpart, MIL-V10. These have rotor diameters of 114 feet and can lift 22 tons.

BRUCE FRAITES, Taylor, Mich.

Right. The CH-54A is our *biggest. Incidentally, these ships are giving a good account of themselves in Vietnam—see page 80, this issue.*

Fire-Extinguisher Article Applauded

I want the world to know about "One Extinguisher Controls All Fires" [Dec.]. Every citizen, young and old, should read, remember, and pass on this life-saving information.

A. J. BIEKER, Fire Chief
Hays, Kans.

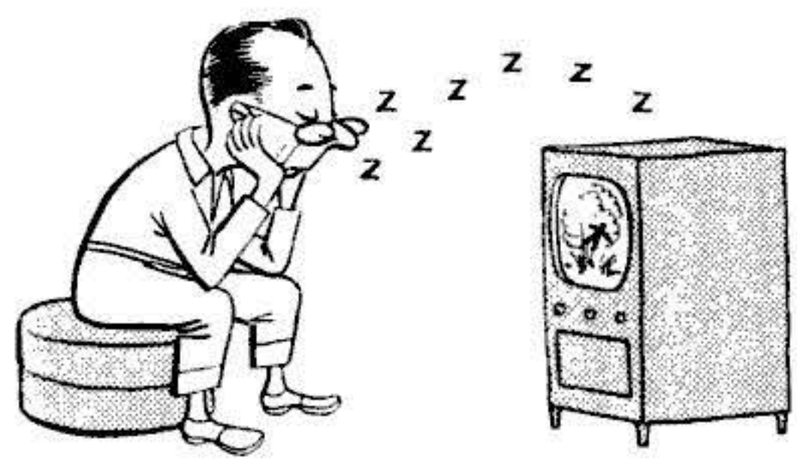
"Fairlane vs. Satellite" Blasted

Jan P. Norbye's "Ford Fairlane vs. Plymouth Satellite" [Dec.] is terrible. Where does he get the idea that many of today's drivers like warning lights? "The Plymouth speedometer reads easier"—easier than what? On the Plymouth, he says, "the manual floorshift . . . throws are too long, and the lever is placed too far forward." These are personal judgments and would depend on the driver, seat position, etc. He states "the Fairlane is . . . relatively indifferent to strong crosswinds, while the Satellite drifts off course under wind pressure from the side." What does he mean by relatively indifferent? Any car made will drift sideways if enough wind pressure is applied.

R. D. MANNERS, Youngstown, N.Y.

The lighted idiot light (whatever can be said against it) is more visible than a falling gauge. The sweep needle on the Plymouth's speedometer is considerably larger than on the Ford, giving added detail, more precise readings. On the Plymouth floorshift, a number of drivers, varying in size and stature, came up with the same complaint: The throws are too long, the lever is too far forward. Concerning wind pressure, the same side wind that blew the Plymouth off course left the Ford unaffected.—J.P.N.

U.N.C.L.E. Expose Makes Him Unhappy



Though the story was interesting, "The Man from U.N.C.L.E." [Dec.] will never seem the same, now that you've revealed all the secret gadgets.

JOSEPH PELUSO, Brooklyn, N.Y.

"Hello Girls" Still With Us

"They're Still Inventing the Telephone" [Dec.] gives the impression that our force of operators had been virtually eliminated by 1935. The fact is, they're still with us, and in greater numbers than they were then: 150,000 today compared to 95,000 30 years ago. Incidentally, dial phones came along early in the 20s—by 1935, more than 41 percent of our customers had them.

WILLIAM P. MULLANE JR.
AT&T, NYC.

Trade Secrets Circumvent Law?

There is no real problem involved in taking with you what you've learned when you change jobs ["How Much of Your Job Belongs to You?", Dec.] except that the corporations want to have their cake and eat it, too. It is unfortunate that the courts continue to hoe the corporate row. Patent laws exist to give the inventor a protected period to exploit his invention *in return for which the invention be-*

Continued

Copyrighted material

Why are we painting all our engines blue?

Will it make them start faster on a cold morning?

Not one bit. Ford-built engines earned their reputation for quick starts long before blue paint. We keep our test facilities running 24 hours a day, 6 days a week, to prove out engines in broiling heat and freezing cold.

Will our new blue engines save on gas?

Not because of the paint. It's what's *under* the paint —cylinder blocks, manifolds and pistons designed to save gas. A Ford-powered Falcon is still America's all-time economy champion for either sixes or eights.

Will Ford-built engines give better performance?

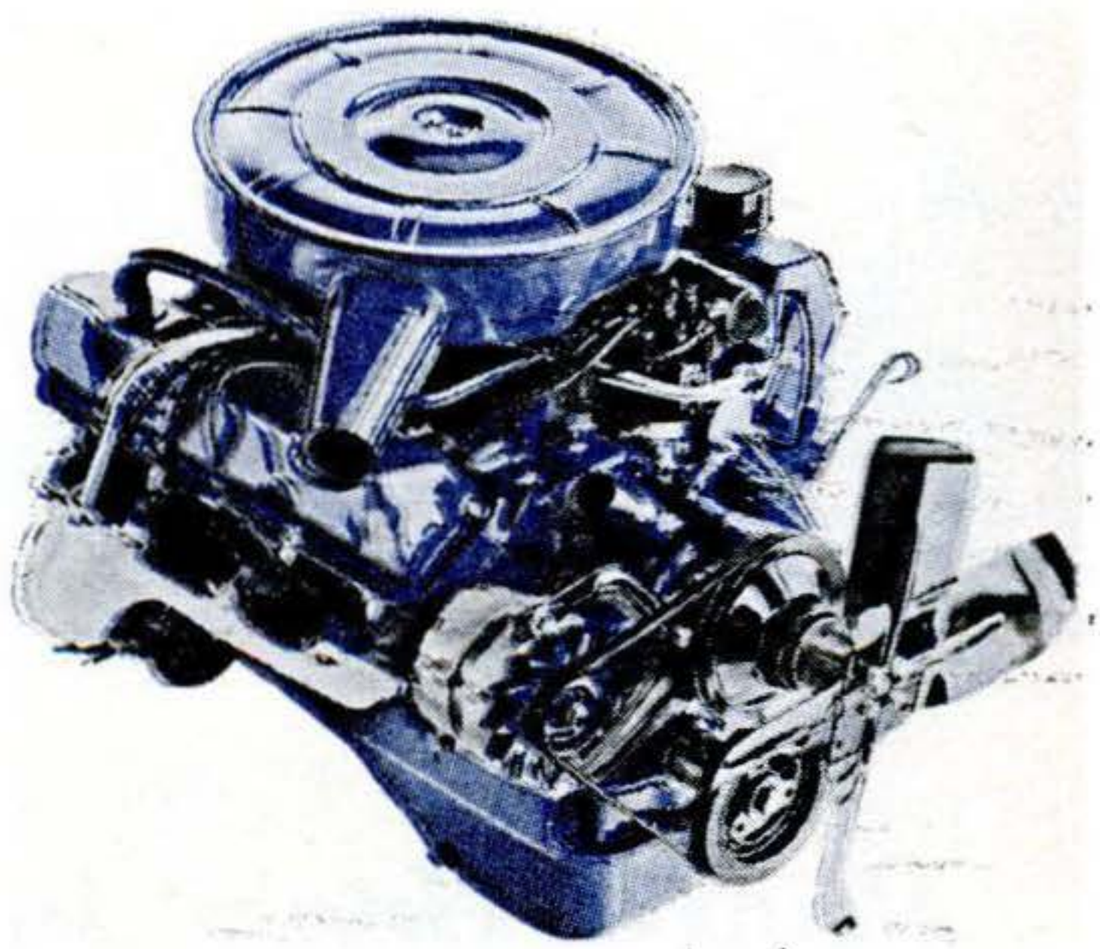
Positively yes. (Whether they're red, white or blue.)

Ford Motor Company took over first place in V-8 engine leadership back in 1932 . . . the year we introduced our first mass-production V-8. Since then, we've built and sold over 35 million V-8's—more than any other manufacturer.

So, why blue?

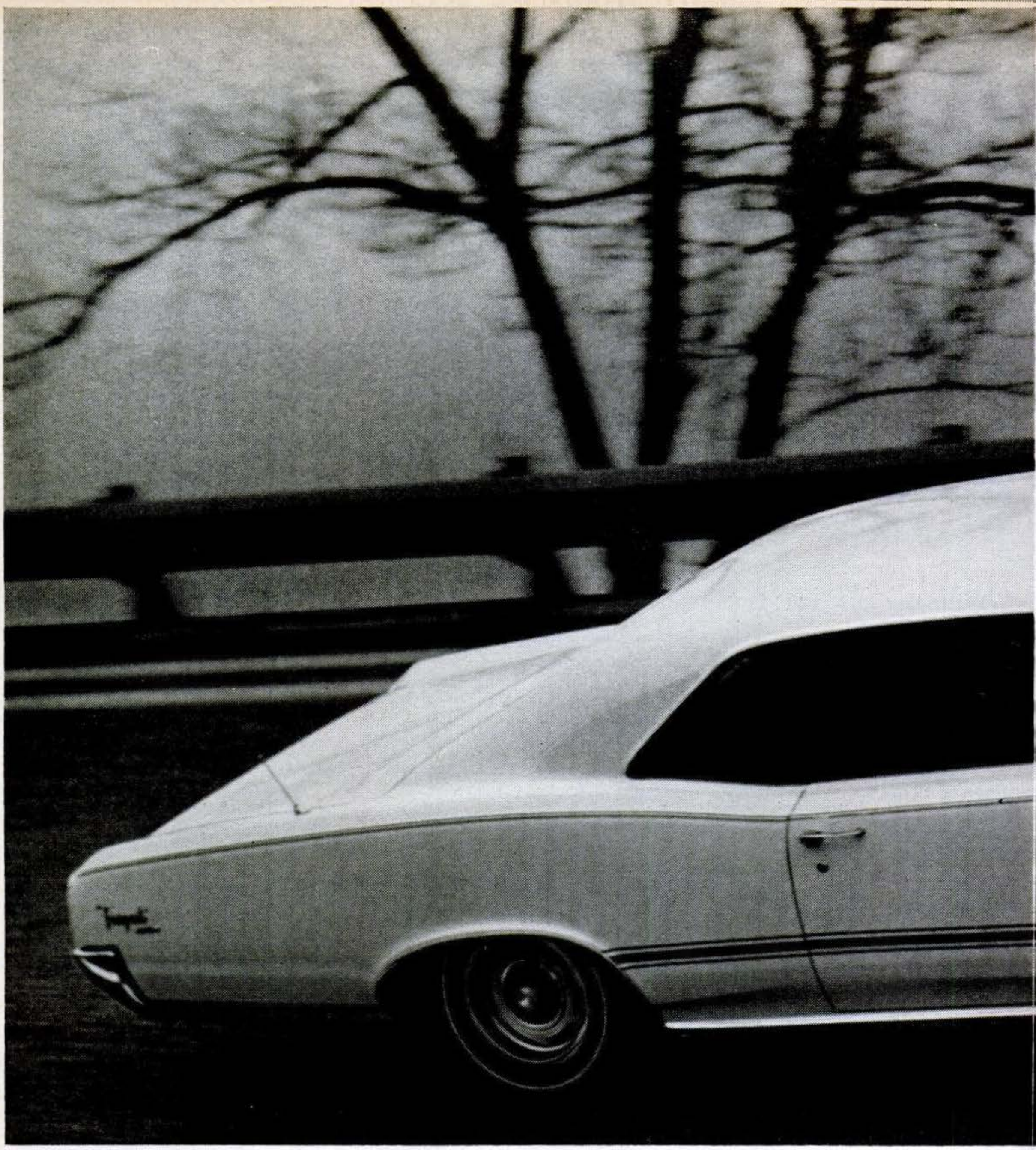
Because we want you to know the instant you see a Ford-blue engine in a car . . . truck . . . or tractor . . . it's *Powered by Ford*—built to the highest standard of engineering excellence.

If you don't happen to like blue engines—just quietly close the hood. Chances are you won't have to raise it again for a long, long time.



"You've heard of green giants . . . white tornadoes . . . so why not blue horses?"

Copyrighted material



Pontiac Motor Division • General Motors Corporation

GeeTO Tiger, Jr.

The toughest kid on the block now has a mean little brother. Motive power is that exotic new plumbing, the Pontiac OHC Six. The 207-hp edition that eats air through a Quadrajet 4-BBL and spits out rpm's by the thousands. Shake a moist hand with our new OHC Sports package. Available on any Tempest or Le Mans except wagons. The little tiger weighs in at a couple hundred pounds and comparable dollars less than our GTO.

Copyrighted material

You can get five full-color action shots of our new OHC Six and the other Wide-Track Tigers—all suitable for framing. See details below.

Sports striping, special emblems, heavy-duty suspension, front and rear seat belts (be sure to use them), and an all-synchro 3-speed with Hurst floor shifter come with the package. Ditto chromed air cleaner, Sunday-dress cam cover and split exhaust manifold. And you can lovingly apply GTO-type options to your heart's content. It's all written down in the GTO family album. At your corner Pontiac store.

Pontiac will send you five, ready-to-frame 26"x11½" color reproductions of the famous GTO, 2+2 and new OHC Six—plus full factory specs on all three, plus five GTO emblem decals. Send 25¢ (35¢ outside USA) to: Wide-Track Tigers, P. O. Box 8881, 196 Wide-Track Blvd., Pontiac, Michigan 48053. (No stamps please.)

3 Wide-Track Tigers—GTO, 2+2 and new OHC Six

Copyrighted material

No Ordinary Oil Filter Can Protect a Car's Engine for the 6,000 Mile Oil Change Interval Specified by Car Factories . . . WIX Multi-Cel Filters Can and . . . . . Do!

Whether you drive a car, truck or tractor go to the dealer who gives you your money's worth . . . the man who sells WIX Oil, Air and Fuel Filters. Get the extra bonus miles of filtering performance . . . you'll notice the difference with WIX, in improved mileage and reduced engine wear.

WIX® FILTERS

WIX CORPORATION • GASTONIA, N. C.
THE GOLD STANDARD IN FILTRATION

comes public property after the designated period. The corporations are trying to circumvent the law with "trade secrets" . . . If a corporation chooses to ignore the protection afforded by the law, it should be required to accept the consequences, including piracy.

Name withheld by request

Transporting Guns

A gun has to be broken down or packed in a case to be transported by car in the state of Michigan. Readers might check local laws before building the car gun rest [Dec.].

MRS. JAMES FREEMAN, Harrietta, Mich.

Signs for Slow-Moving Vehicles

I'd like to show other PS readers a picture of the Slow Moving Vehicle sign now being

adopted by many states. We farmers realize we are sometimes a hazard on highways with tractors and other equipment. I have SMV signs mounted on mine—they can be seen about a half-mile away, day or night. It is our hope that the motorist will become familiar with it.

DON KRAMPER, Dakota City, Nebr.

Nut Repairs a Cut Bolt

Re "Die and File Help in Cutting a Bolt" [Dec., p. 28], a die isn't necessary. Just thread the nut that matches the bolt on it before you cut it; backing it off will straighten the threads. If you want a nice clean job, put two nuts on and tighten back-to-back at the cutting point.

FRANCIS C. HALL, Brooklyn, N.Y.

Installing Color TV

As a color-TV service manager, here's my side of "Color TV: How to Live with It and Love It" [Dec.]: 1) An installation made properly with 300-ohm lead-in can rival a co-ax installation. The mention of 300-ohm shielded cable is absent in the booklet, although it has lower loss than co-ax and needs no matching transformers. 2) Centering the picture can be accomplished without the particular pattern shown in the booklet (page 6), and on some sets without any pattern at all.

Continued

Copyrighted material

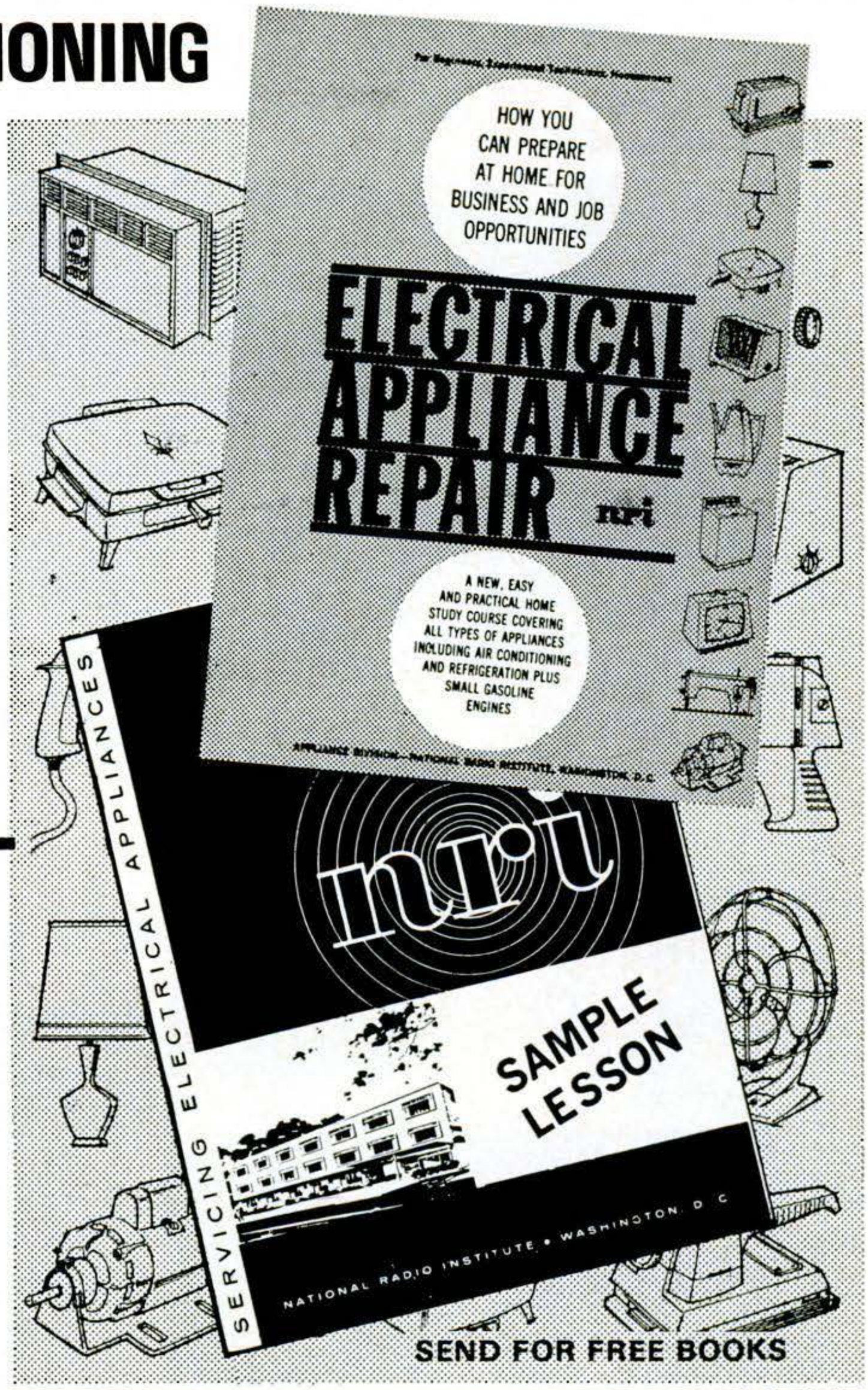
EARN-WHILE-YOU-LEARN APPLIANCE REPAIR AND AIR CONDITIONING

THESE TWO

FREE BOOKS

CAN START YOU ON YOUR WAY TO:

* new high-pay skill
* business of your own
* spare time income
* savings on appliance repairs



THIS NEW, SHORT EASY COURSE TRAINS YOU AT HOME

THE BEST WAY TO GET AHEAD
is to make yourself better qualified than the next man. You can prepare quickly to do *professional* appliance servicing at home in your spare time.

NEW EASY COURSE
shows you step-by-step professional methods for repair of all types of appliances...including air conditioning, even small gasoline engines, farm and commercial equipment.

AMAZING PROFITS
in your spare time...in improved job opportunities...in a business of your own. You earn-as-you-learn *professional* methods of appliance repairs...are ready to start servicing appliances after only a few lessons.

LOW COST TRAINING COVERS
everything...special equipment is included in your course at no extra cost.

nri

APPLIANCE DIVISION, NATIONAL RADIO INSTITUTE
3939 Wisconsin Ave., Washington, D.C. 20016

MAIL THIS COUPON TODAY!

Appliance Division, Department 601-026
National Radio Institute
3939 Wisconsin Avenue, Wash.,D.C. 20016

Send me the illustrated free book that tells about opportunities in Electrical Appliance Repair and details of NRI's new course—plus a sample lesson. I understand there is no obligation and no salesman will call.

Name ..... Age .....

Address.....

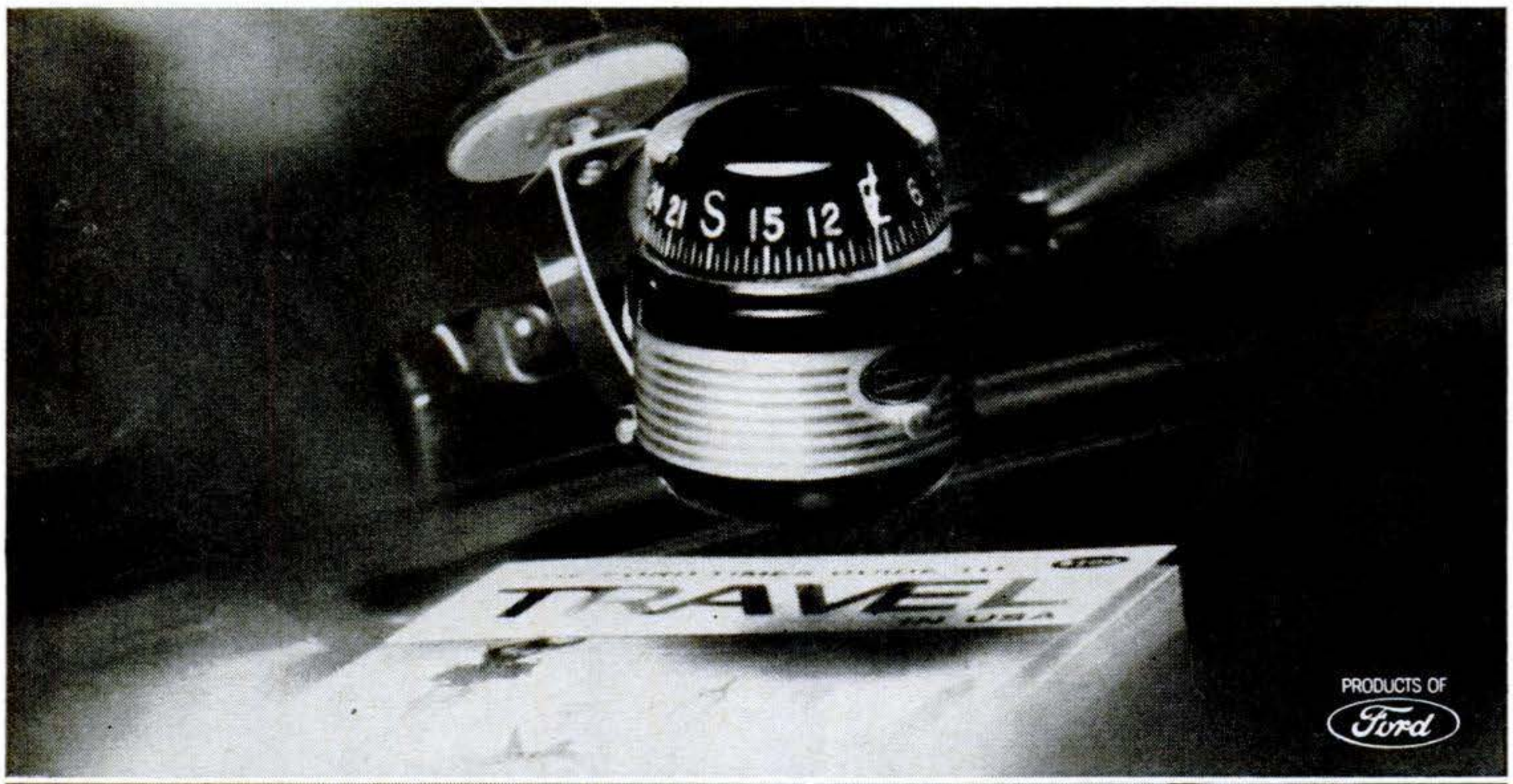
City ..... State ..... Zip Code .....

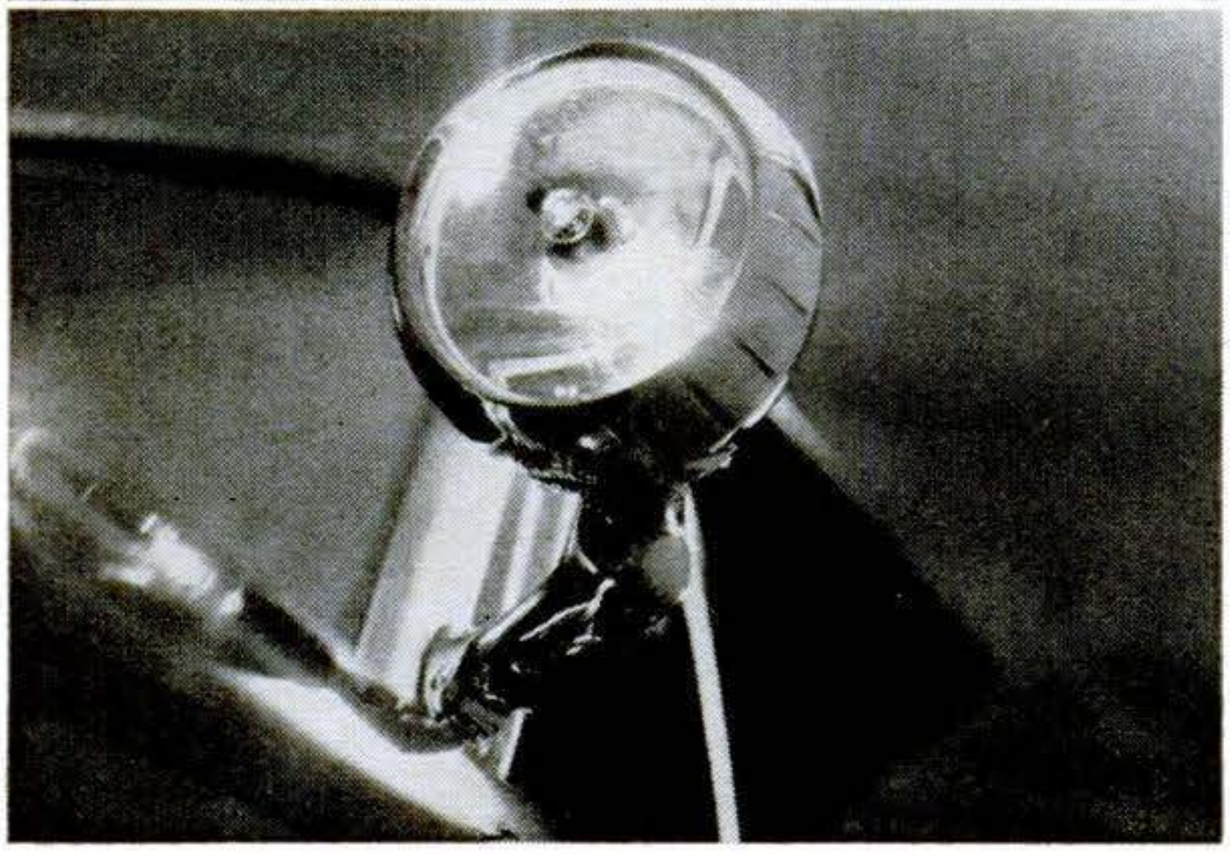
Accredited Member National Home Study Council

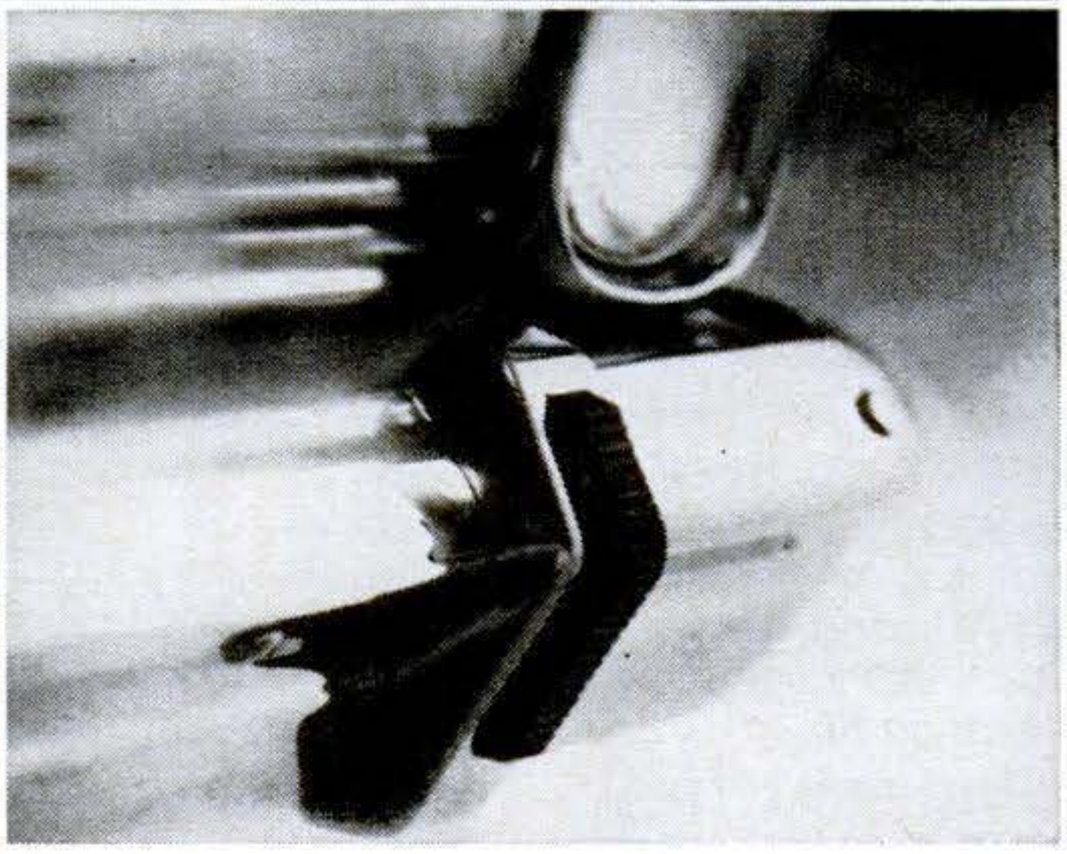
Copyrighted material

Who's got everything for your Ford

from Compasses An accurate, dependable device for getting bearings in unfamiliar territory. Attaches to windshield, instrument panel or garnish molding. Illuminated for nighttime driving. $7.95*







to Spotlights This stylish addition features a long-distance sealed beam lamp to help you pick out addresses and read roadside signs on the darkest night. Can be adjusted to any position from within car. $29.95*

*Manufacturer's suggested retail price. Installation charges, state or local taxes, are extra.

to Bumper Guards These heavy gauge, chrome-plated steel guards with thick rubber inserts help absorb shocks, reduce bumper dents and scratches, lessen the possibility of bumper locking. $14.60* a pair (front). $18.35* a pair (rear).

Your local Ford Dealer of course!

You'll get the most for your driving pleasure from your Ford Dealer.

Copyrighted material

Last spring, in Playboy, we claimed our Quadralift hull would go "significantly faster than any other pleasure boat on the market."

Competition horselaughed.

Then one of our Quadralift boats shaved a whole week off a long-standing world's record.

Competition's eating humble pie.

Last year on the St. Johns River, Jacksonville, Florida, Winner's *Marlin** (16′ 4″, fiberglass, $1,128) broke the World's Ten Thousand Mile Endurance Run record of 24 days.

Fifty men and thirteen women drove the boat continuously in 4-hour shifts. They maintained a stupendous average speed of 25 miles per hour.

The craft was powered only by a single 50 hp engine.

Midway during the marathon, *Marlin* was run down by a huge 36′, 8-ton cruiser. The force of the collision knocked a hole in *Marlin's* starboard bow and caused a woman crew member to suffer three broken ribs. (Think what such a bang would have done to an aluminum or wooden hull!)

Immediately after the accident, *Marlin* sped back to home base for repairs, without taking as much as a teacup of water. No structural rebuilding was required. Just a patch.

When *Marlin* **splashed** through to finish, it had established a new World's Record: 16 days, 15 hours, and 41 minutes! Winner had broken the world's record by more than a week! (Said one excited sportsman, "Anything that lops a week off of any world's record has got to be a time machine.")

Professional statisticians told us that in those 16 days, Winner's *Marlin* lived 18 years of average boating use. (We say that anything that can live *18 years* in *16 days* must be a time machine.)

Baronet with 65 n.p. outboard

Each Winner boat is dynamically designed. *Marlin's* hull incorporates Winner's famed Quadralift concept. A Quadralift hull figuratively "shifts gears", shifting to one of four different levels, depending upon your speed. You go safer at higher speeds and faster on less fuel than in any other comparably-priced pleasure boat. Heavy waves from either side don't alter your path. With Quadralift, you go straight as a locomotive.

Each Winner boat is crafted by skilled hands. We use only heavy, chrome-plated brass and stainless steel fasteners. In fact, all hardware supplied on Winner boats is guaranteed for two years against corrosion or any other kind of deterioration.

Each Winner is made to defy time. Winner boats don't just endure; they prevail. One of the first fiberglass boats we ever offered to the public, back in 1947,

Cobra with 60 h.p. I/O

is still seaworthy **and spunky.** We found it not **long ago in a** New York boat livery.

So, when you look at a Winner, you're looking at a winner. And when you buy one, you're buying a craft that you can expect to enjoy for at least 18 more years.

Even if you get in a tangle with an 8-ton cruiser.

Winner Boats

Our new 1966 catalog is yours for a dime. Send 10¢ and your name and address to us at P. O. Box 231, Dickson, Tennessee.

**We don't call it* Marlin *any more. We've changed the name to* Marathon. *We think you'll understand.*

Copyrighted material

Now...a motor that FOLDS!

Evinrude's new 3-foot, 3 hp Lightwin folds and fits in a 2-foot carrying case. Goes anywhere (with weedless drive). Stows anywhere — car trunk, closet or camper trailer. Handiest fishing motor ever made. See it now at your Evinrude dealer. He's listed in the Yellow Pages under "Outboard Motors." FREE CATALOG. Send the coupon now for your free copy of Evinrude's new 1966 catalog of motors, boats and Skeeter snow vehicles.

EVINRUDE
first in outboards
DIVISION OF OUTBOARD MARINE CORP.

EVINRUDE MOTORS, 4187 N. 27th St., Milwaukee, Wis. 53216
Send free Evinrude Motor and Boat Catalog for 1966 to:

Name.....

Address.....

City.....State.....Zip Code.....

PS Readers Talk Back

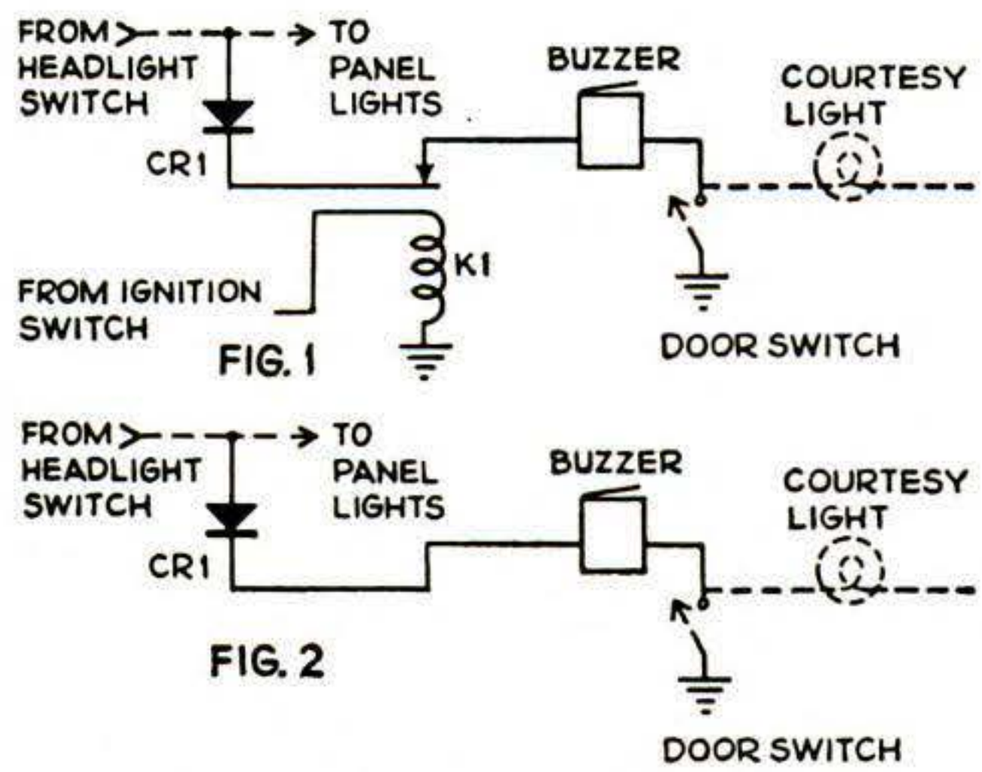
[*Continued*]

3) The north-south setting for purity and convergence does not apply to all color sets. 4) Not every installation requires the use of a field-strength meter—the readings can be misleading.

DANIEL L. BROPHY, Tucson, Ariz.

We agree for the most part, although in our experience co-ax is superior to twin lead, at least in urban areas. On the other points, the PS booklet covers the fundamentals that apply to most sets in most locations. As any competent installer knows, there will be exceptions.

Simplified Headlight Alarms



Either of these simple alarms will warn you if you've left your headlights on when you open the car door. Figure 1 uses just one relay, and performs exactly like the circuit shown on page 171 of the December "Hints from the Model Garage." Figure 2 uses no relay, but will operate with ignition on or off. Diode CR1 is reversed in positive-ground cars.

ARTHUR M. VIKLA, Alameda, Calif.

Mustang and Panther

Your Automotive Editor should join an advertising agency. I'm tired of slanted remarks like that in "Chevrolet's New Rival for the Mustang" [Dec.] where he says "a drag strut was incorporated in the *all-new* '65 Impala." Really, now!

ROBERT L. BOTTORFF, North Bend, Ore.

What's new? Oh, just the frame, body and body mountings, front suspension and steering, rear axle, rear springs, and axle-location system. The engine is the same.

. . . Thanks for the article on the Panther ["Chevrolet's New Rival for the Mustang," Dec.]. Ford has a good thing going for them, and Chevy doesn't want to lose customers. How about an article comparing them—say a 350-hp. Panther against a Shelby-tuned Mustang GT?

THOMAS RIZZO JR., Long Island City, N.Y.

Copyrighted material

- For Action, Security, Big Pay -

WE CHALLENGE YOU TO TOP THIS JOB!

Earn To $15 An Hour ★ Work Part-Time Or Full-Time ★ Car Furnished — Expenses Paid ★ No Selling — No Previous Experience Needed ★ Only Average Education Required

NO OTHER CAREER OFFERS YOU A BRIGHTER FUTURE

Consider this fact. In the short time it takes you to read this page 1,100 accidents will take place. Over 440,000 will occur before this day ends. *These accidents must be investigated.* The law demands it. Yet in 4 out of 5 cities, towns and rural communities, no one has been trained for this vital work.

KEEP PRESENT JOB UNTIL READY TO SWITCH

Step into this fast-moving Accident Investigation field. *Already* hundreds of men we have trained are making big money. Joe Miller earned $14,768 his first year. A. J. Allen earned over $2,000 in ten weeks. Robert Meier says "I'm now earning $7.50 to $15.00 an hour in my own business . . . Universal's course is wonderful."

FREE EMPLOYMENT HELP GIVEN

We CAN and WILL show you how to rapidly build your own full-time or part-time business. Or if you wish a big-pay job as Company Claims Investigator, our Placement Service will give you *real* assistance. Hundreds of firms needing men call upon Universal. *We place far more men in this booming field than any other individual, company or school.*

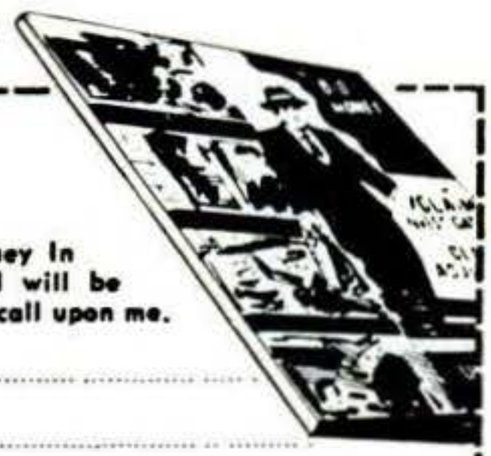
WE FINANCE YOU

Write today for complete information. Costs are less than you'd imagine. And even on these low costs you need pay only a portion — less than half — in order to complete your training. We finance the rest for you. You may pay out of actual earnings. And you can keep present job while learning. Send now for free book. No salesman will call. You are not committed in any way.

EARN WHILE YOU LEARN

Let us show you how easy it is to get into this exciting new career in just a matter of weeks. You need NO prior experience or higher education. There's NO investment in expensive equipment. You do NO selling. Furthermore, this fast-growing Accident Investigation field has no seasonal layoffs . . . no time out for strikes . . . no oversupply of men . . . no worry about automation. We ask you to compare these terrific advantages with the job you now have! Cash in on this big demand for trained men NOW. *Write today!*

Mail Now for FREE BOOK



M. O. Wilson, Dept. PS-2
Universal Schools,
6801 Hillcrest, Dallas, Texas 75205

Please rush me your FREE BOOK on Big Money In The Booming Accident Investigation Field. I will be under no obligation — and no salesman will call upon me.

Name .....

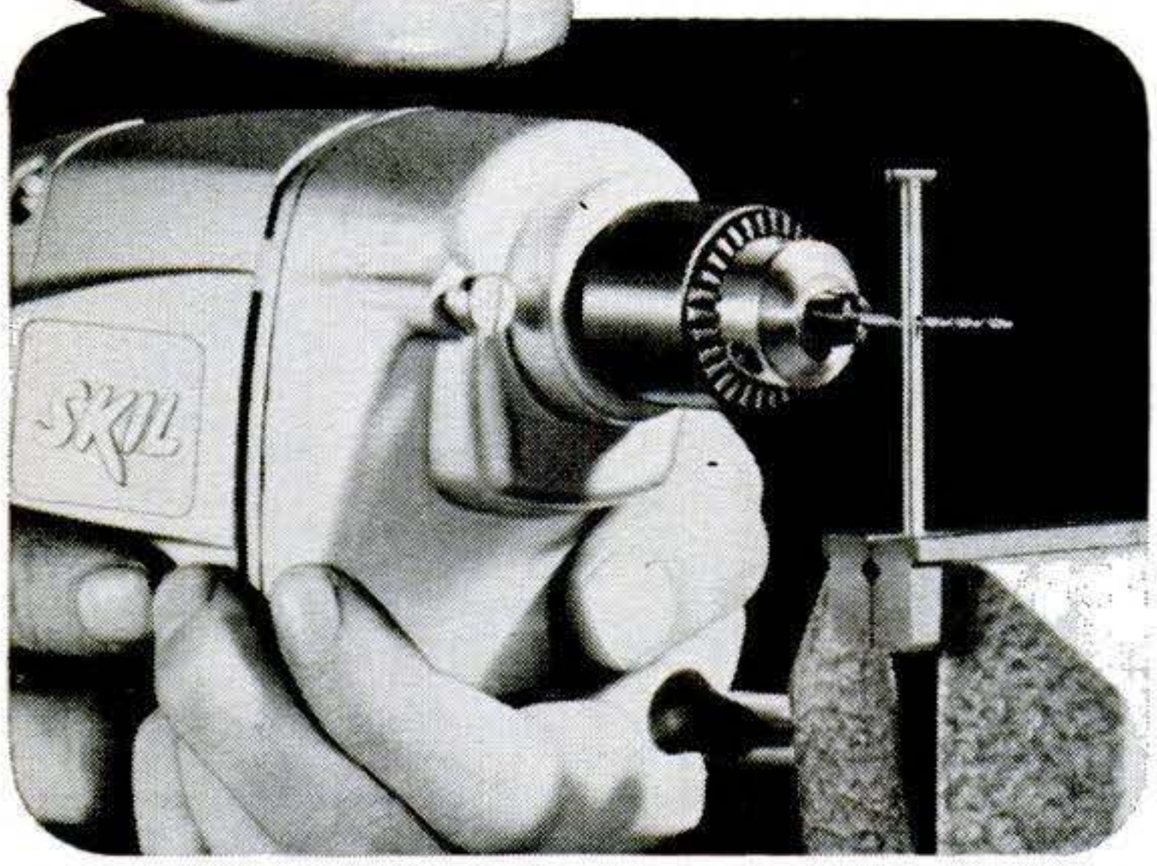
Address .....

City ..... State ..... Zip Code .....

Copyrighted material

The green trigger identifies the greatest advance in electric drills in 50 years!

Amazing! New! Skil



HOLE IN NAIL DEMONSTRATES THE AMAZING CONTROL OF NEW SKIL DRILL. We did it with the ¼″ Skil Trigger Speed Control (TSC) Drill. TSC drills also available in ⅜″ and ½″ sizes.

A PRECISION DRIVER, TOO! With the versatile Skil Trigger Speed Control Drill the variable speed feature lets you start screw at low speed, run it down at high speed, set it by slowing to a stop.

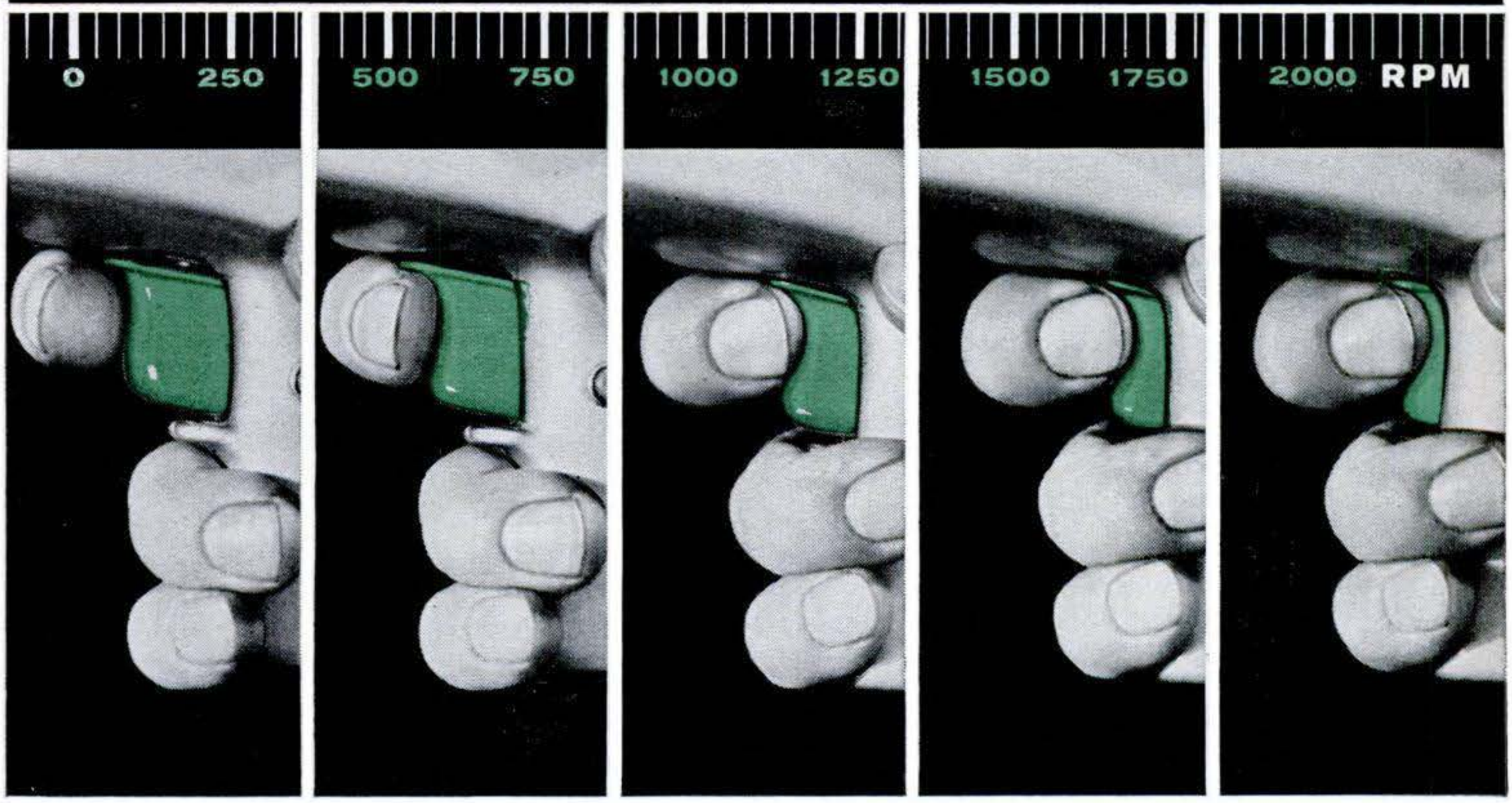
Go with the pick of the pros... **SKIL POWER TOOLS**

Skil Corporation, 5033 Elston Ave., Chicago, Illinois 60630

Copyrighted material

SQUEEZE THE DRILL SPEED YOU NEED

With Trigger Speed Control you actually sense the correct speed with your trigger finger—much as you sense your car's speed with your foot on the accelerator.



Trigger Speed Control Drill

For the first time, you regulate speeds, from 0 to 2,000 rpm's, with your trigger finger

TO DRILL THE MATERIAL

You get stepless speed control to drill plastics, composition materials, wood or metal by varying finger pressure. No buttons or dials to fool with.

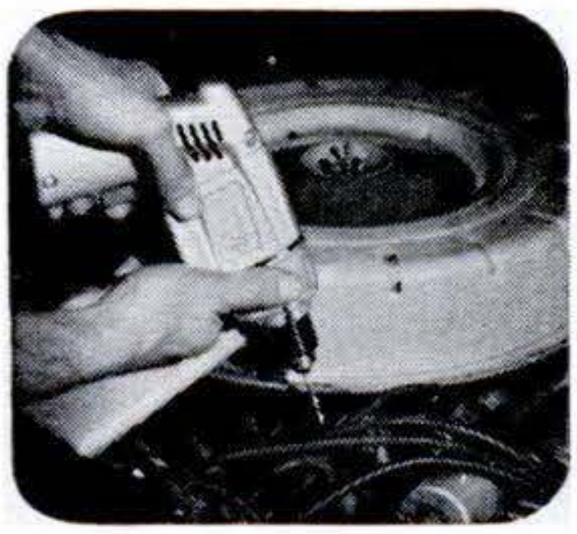
TO DRILL HOLES IN METAL WITHOUT CENTER PUNCHING

Start with light trigger pressure which keeps rpm low, makes bit placing easy—even on convex surfaces.

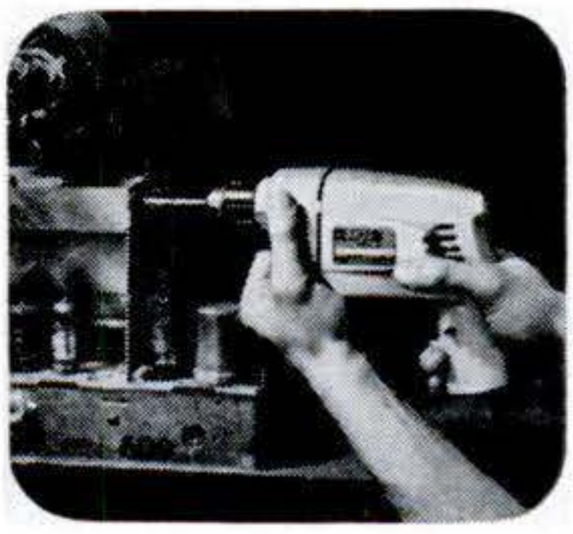
TO DRIVE SCREWS TO EXACT DEPTH

Exchange drill bit for driver bit, drive screws to exact depth you want. Even drive self-tapping metal screws—without center punching.

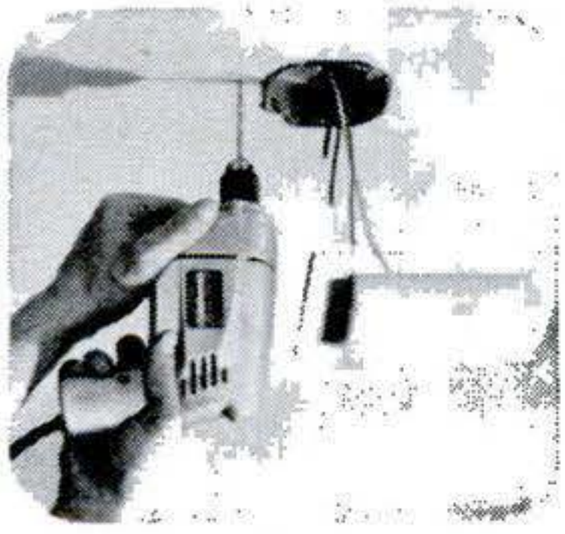
SEE NEW SKIL TSC DRILLS AT BETTER DEPARTMENT, HARDWARE AND LUMBER STORES EVERYWHERE



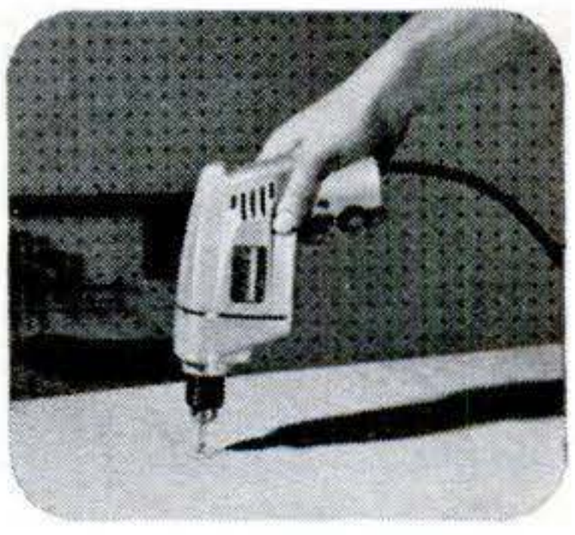
AUTOMOTIVE



RADIO-TV



MAINTENANCE



WORKSHOP

Copyrighted material

"Say, Smokey—"

A clinic on cars by America's most famous mechanic

Each month in POPULAR SCIENCE Smokey Yunick answers questions on cars—family cars, high-performance jobs, hot rods, and racing cars—selected from those sent in by readers. Got a problem? Ask Smokey. You'll find the address at the end of the column. Please *print* your name and address.

"The differential on my '61 American Rambler, with 36,000 miles on it, has no drain plug. Should I loosen the plate to drain out the old oil and refill with new?"

RUDY SWANSON, Anaconda, Mont.

You certainly should. But before refilling (with the proper type and grade), flush it out with rear-axle flushing oil to prevent metallic residue and dirt from damaging the bearings and gears.

"When I back up my new Pontiac 2 x 2, with one four-barrel on the 421 engine and automatic transmission, I get a terrific chatter. The agency's head mechanic tells me the noise is coming from the safety-track differential, which has a close tolerance this year. He also says the noise probably will work itself out by the end of the 2,000-mile break-in period—if it doesn't, he will put in a special lube. Can he be right?"

JOSEPH CERVONI, Newburgh, N. Y.

I have heard a Positraction axle make that sort of noise backing up as well as in slow, hard turns. Better go along with the mechanic. If your trouble doesn't work out in 5,000 miles, ask the dealer to replace the unit—you have a two-year or 24,000-mile warranty.

"Is there any kind of service that will help me recover my car keys if I lose them?"

JOE DONNER, San Francisco.

You bet there is—and you can serve a good cause in the bargain. Simply send your license-plate number and name of your home state to the Disabled American Veterans, 1425 E. McMillan, Cincinnati 6, Ohio. For a small contribution, they will send you a tiny duplicate of your plate for your key chain. On the back of it is the DAV's headquarters address. Retrieval and return cost you nothing.

"I have a '62 Chevy with the 283-inch engine, automatic transmission, power steering, and power brakes. I get 15 m.p.g. on the road, but performance is bad. Top speed is around 88, but it takes a mile or more to get up there. The distributor was checked out on an analyzer, points and plugs replaced, and the compression checked at 140. The engine doesn't miss at the low end or at the top, and idles perfectly. The spark advance is okay. How can I get more out of this job?"

EUGENE RISHER, Spencerville, Ohio.

You didn't give the total mileage, but your car's performance is way off. Sounds like ignition or fuel trouble. Make certain you are getting full advance at road speeds—not at idle. Check the fuel pressure at road speed, or 1,000 r.p.m. Then have a good carburetor man run through that carb. Be sure the cam or chain is not worn. Check the valve timing. Make sure the lifters are not pumping up. Check the exhaust system, including the heat riser. Properly tuned, this job should do 100 m.p.h. any old time.

"The oil-pressure gauge on my '64 Lincoln moves very slowly towards the normal range with a cold engine start. With a hot engine, the pointer is at midscale only at speeds above 25 m.p.h. Idling, when hot, the needle slowly settles to the very low side. Oil consumption is okay. Replacement of the sensing unit on the engine made no difference in the readings. The dealer claims this is normal for Lincolns."

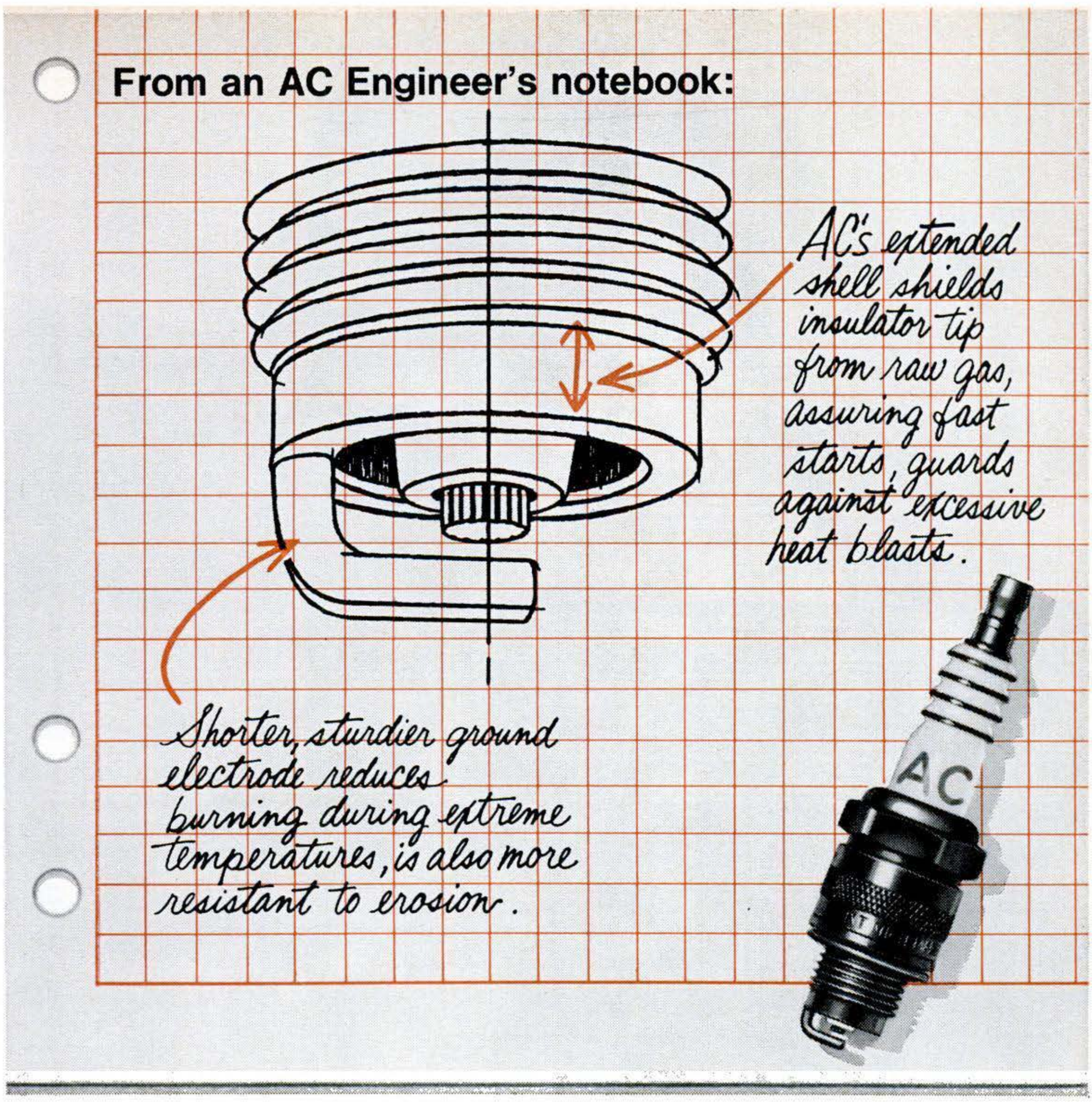
S. BROWN, Cherry Hill, N. J.

I believe your oil pressure is normal for Lincolns. If it worries you, have a master direct-reading gauge put on for a check. It should show at least 20 p.s.i. at idle and around 40 at 50 m.p.h. with a warm engine.

"Many late-model cars have an intake pipe on the air cleaner that is much smaller than the carburetor inlet. Does this limit engine capability? If so, will it help to cut additional

Continued

Copyrighted material



How AC's exclusive Extended Shell Design improves extended tip spark plug performance

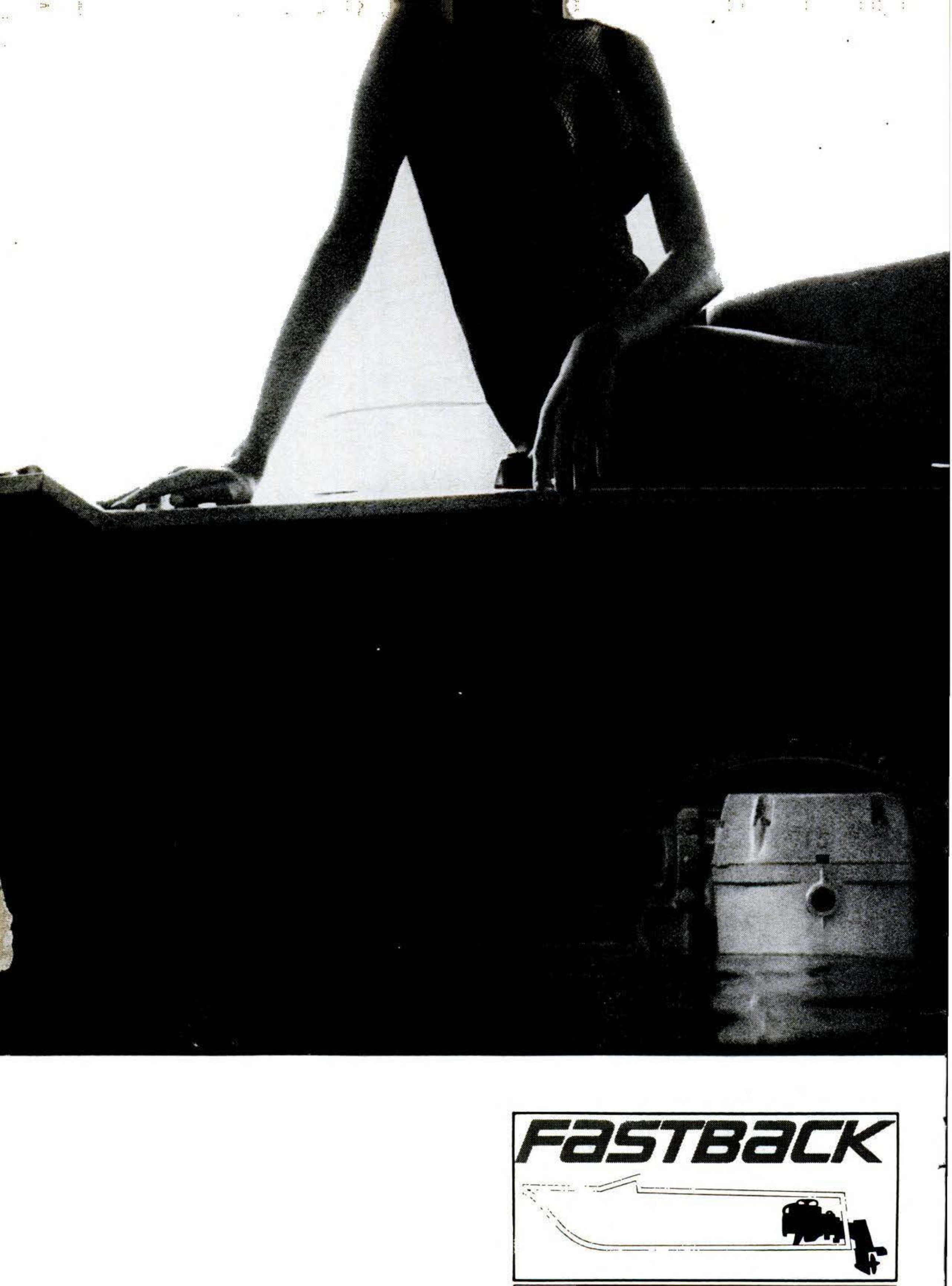
AC Fire-Ring Spark Plugs with the extended tip design feature AC's exclusive extended shell. This puts the spark plug tip deeper in the combustion chamber closer to the center of the fuel charge. The result is a combustion pattern that promotes greater engine power and economy. AC's extended shell protects the tip from excessive heat blasts. It also guards against "drowning" during false starts. If your car's engine is designed to use extended tip spark plugs, gain the benefits of AC's exclusive extended shell with the shorter, sturdier ground electrode. Insist upon AC Fire-Ring Spark Plugs at your next engine tune-up.

AC

FIRE-RING SPARK PLUGS

AC SPARK PLUG DIVISION OF GENERAL MOTORS

Copyrighted material



*For 24 months after purchase, OMC Stern Drive will replace to the original purchaser of an OMC Stern Drive any part of its manufacture, which upon inspection proves to have failed in normal use due to faulty material or workmanship.

FASTBACK

OMC STERN DRIVE

OUTBOARD MARINE CORPORATION • GALESBURG, ILLINOIS

Copyrighted material

Play it smart and the only strain on your transom will be 108 lbs., blonde blue-eyed, with a great tan.

Play it smart with FASTBACK OMC Stern Drive. You see, OMC FASTBACK units virtually eliminate transom strain. They're available with a unique floor-mounting system that's rubber mounted. The power unit is anchored directly to the bottom . . . the drive unit merely floats through the transom. Result: nothing hangs on the transom, power thrust is applied directly to the hull where it should be.

And OMC FASTBACK units turn tighter than other stern drives . . . a full 90° port to starboard. Great for maneuvering in crowded harbors or slipping into a tight docking situation. OMC FASTBACK is available with a unique, stay-on-course steering system, too. Makes OMC FASTBACK a lot safer, easier to control at high speeds.

Power? All you want with OMC FASTBACK. Four powerful models, all the way from a sizzling 90 hp . . . to a thundering 200. Any one will pop a water skier out of the water in moments, yet crawl slow enough to tease a lure past a lurking walleye. And OMC FASTBACK models include full 75° power tilt and exclusive electric power shift at no extra cost. And an exclusive 2-year warranty*.

Go on. Test drive OMC FASTBACK in the boat of your choice . . . or send for the FASTBACK Fact Book: Outboard Marine Corporation, Stern Drive, 12 Arbor Ave., Galesburg, Illinois. You could be hooked and love it. Then you'll specify OMC FASTBACK in your boat!!

Copyrighted material

nuts & bolts

Jig saws, abrasive bands, auto parts, skilled mechanics... anything? Just let your fingers do the walking. Action-People do.

openings in the air-cleaner can? What's the purpose of the restriction?"

GEORGE HALL, Houston, Tex.

Don't meddle with the air horn on your air cleaner. These are carefully tuned by factory engineers for fuel and air requirements, and to silence the air intake. A small gain in power may result with bigger holes, but the carburetor action is upset, and corresponding changes have to be made to offset the added air flow.

"My '63 Chevy II Nova won't idle after being started when warm, but runs like a charm otherwise. After a few minutes of driving, it will idle okay again. Then, after five to 10 minutes, I get idling trouble again. I added another gasket under the carb and made sure the fuel line wasn't touching anything. New points and plugs have no effect. Any suggestions?"

ROBERT A. NOVA, Issaquah, Wash.

The trouble is in your carb—assuming your car has four cylinders. It won't idle because it's either too rich or too lean. Have an air-fuel-ratio analyzer put on for a test to determine which, and have the carburetor corrected accordingly.

"My points begin to burn as soon as they are installed and have to be replaced after three to four weeks in my '62 Chrysler 300. It has a single point set distributor. My mechanic has replaced the ballast resistor and the pigtail wire to the distributor, and soldered a ground wire inside the distributor to insure good contact, but nothing helps. I also get a vibration in the gas pedal at about 49 m.p.h. Any suggestions?"

HAROLD WEITZMAN, Brooklyn, N. Y.

Check for oil getting on the contacts. Have the voltage regulator set for the correct specs, then have the voltage checked for the distributor, both starting and running. Also, have the condenser and coil checked. I believe your trouble will turn out to be voltage. As for the vibration, there are many possible causes. The main ones: something in the engine itself, or the flywheel and clutch assembly, may be out of balance; bad engine mounts or a tight exhaust system, or even a bent or out-of-balance drive shaft, or incorrect pinion-gear angle; a bent wheel; or out-of-round tires. If you have an air conditioner, the compressor could be out of balance.

"Every 3,000 miles I have to replace the ball bearing of the right rear wheel of my '61 Volkswagen. Once, a new axle was put in and once a washer with the same result. Can you tell me the cause?"

A. L. SWARENS, Brazil, Ind.

Be certain you are using the correct bearing

Continued

Copyrighted material

ELECTRICITY

EARN as you LEARN—
In Your Spare Time at Home

ELECTRIC APPLIANCE REPAIR

Industry Pays Trained Electricians Top Wages

S. T. Christensen
President

This is a "Push Button Age" — everything is becoming automatic — men with Electrical "Know How To" are needed everywhere — and will always be needed.

HERE IS MY OFFER

If you want to increase your income – by having a part or full time business of your own – or a big paying career job in Electricity – I will send you everything you need to get started NOW.

17 BIG TRAINING KITS

Professional trouble shooting electronic equipment – quickly locate electrical problems (shorts, open, power failures, etc.); professional electric repair tools; audio recordings that bring the instructors' voices into your home, making things easy to understand; thousands of exploded views, photographs and drawings showing how parts fit together, how buildings and electrical equipment are wired – charts telling you how to fix things quickly, correctly – ALL ARE SENT TO YOU.

REPAIR ALL APPLIANCES

ATS (Advance Trades School) training is complete training, is easy training, is approved training. You learn how to fix irons, toasters, coffee makers, washing machines, refrigerators, air conditioners, etc. There are over 400 million appliances in use. Over 160 different appliances! ALL eventually need servicing and repair. ATS shows you how to fix all of them! ! ! Hundreds of my students, the country over, in cities and small towns alike, have reported earnings of $15, $25, $50 and even more per week while training. Would you like to do the same?

INDUSTRY NEEDS MEN who can service electric equipment. Top wages are paid to Electrical Maintenance Men, Electric Technicians, Plant Engineers, Electric Construction Men, etc. ATS trains you quickly, trains you well. ATS has no fancy frills, no wasted time. You get practical training, actually do 17 shop projects in your own home. Many ATS graduates hold "key" positions in Industry. Start your training NOW.

MOTOR REWINDING homes today have ten, fifteen or more motors. Electric shavers, washing machines, food mixers, vacuum cleaners, refrigerators, power tools, to name but a few. Without motors factories could not operate. ATS teaches you to put motors in good repair – you even build your own rewiring and testing equipment as part of your training program. You learn with ATS by working with your hands. You make and keep valuable testing equipment.

LEARN WIRING You learn how to completely wire or rewire homes, garages, barns and factories – their lighting and power equipment. There are no half ways with ATS training.

NO EXPERIENCE NEEDED

ATS shows you how, gives you the equipment to do it. Your own kitchen table can be where you first "set up shop." ATS men are nationally recognized by wholesale suppliers of parts and materials. We show you how to get repair business, how to charge fair and profitable prices for your work. ATS keeps graduates informed as new appliances, improved electrical techniques develop. It is a regular part of the continuing ATS training program and why ATS training is preferred by so many. You owe it to yourself to investigate the complete ATS Electrical Training Program.

Some of the Equipment I send YOU

LET ATS MEN TELL YOU IN THEIR OWN WORDS

"Earning $50.00 more weekly. Made over $1,000 while training." O. Harness, St. Charles, Ill.

"Received two promotions — worker to foreman to assistant manager." J. Swanton, Oaklawn, Ill.

"My work piles up and I get behind with my studies." M. Bobo, Sr., Tacoma, Wash.

"I am now maintenance man at a large motel at a much higher salary." J. Martin, Kansas City, Mo.

"2 raises in pay since I started with the State Highway Dept. in electrical maintenance." C. DeHut, Phoenix, Ariz.

"Should have taken your course 20 years ago." A. Knoll, Michigan City, Ind.

"Chief maintenance man now at double my former income besides having a profitable sideline business." R. DeWitt, McHenry, Ill.

"One job more than paid for the training." E. Hutson, Chicago

Former $2.30 hour mechanics — "Now Head Maintenance man at Heineman's Bakeries — wages are nearly $200.00 a week." C. Fontenot, Hales Corner, Wis.

"Not a high school graduate but I find the lessons easy to understand." W. Wolf, Grand Rapids, Mich.

"Until my disability I was a tool maker. Your course is a new life to me." W. Haebig, Kenosha, Wis.

"$1,000 Christmas for my family. Got everything we wanted. Will now return to my studies." D. Behrmann, Two Rivers, Mich.

FREE 36 page—4 color book "EARNINGS BY ELECTRICITY"

This seal certifies full accreditation by the National Home Study Council the official accrediting agency of the U. S. Office of Education.

MAIL COUPON
FREE BOOK
No Cost or Obligation

ADD TO YOUR INCOME—MAIL TODAY

S. T. Christensen, President Dept. E-405
Advance Trades School
5944 N. Newark Ave., Chicago, Ill. 60631

Send me your FREE BOOK "Earnings by Electricity." I want to add to my income.

Name..... Age.....

Address .....

City ..... Zone..... State.....

Copyrighted material

DULL FILES IN YOUR BASEMENT GIVING YOU NIGHTMARES?

REPLACE THEM WITH CLEAN, SHARP, LONG-LASTING, EFFICIENT NICHOLSON FILES, AND SLEEP NIGHTS.

Send for your free copy of the filer's handbook, "File Filosophy."

NICHOLSON U.S.A. **NICHOLSON** BLACK DIAMOND U.S.A.

Nicholson File Company, Providence, Rhode Island
Files • Rotary Burs • Hacksaw and Band Saw Blades
Hole Saws • Ground Flat Stock • Industrial Hammers

and lube. Then, before installing the bearing, have the axle and suspensions checked for correct alignment and positioning. The bearing is going out because it is forced to run out of alignment.

"My '62 Caddy has gone 70,000 miles. The starter will barely turn the engine over after it's hot. It does fine when the engine is cold. I have already tried replacing the battery, starter, and solenoid."

DALE STARTZELL, Laurel, Md.

It's excessive current draw, and only a process of elimination will uncover the cause. Use a good service battery with good cables, and bypass the solenoid to start the engine hot. If the current draw is still excessive, the problem is in the starter motor. If the draw is normal, you should turn up the trouble in the cables, battery, or solenoid.

"My 1965 Ford with the 289-inch engine falters on warm engine idle when the engine is started again after running awhile. When left running, it will regain its near-normal operating r.p.m. after some minutes. During idle there seems to be a valve or rocker-arm clatter. The oil has been changed every 2,000 miles for the 8,000 the car has run. Also, this car was designed with the spare wheel located in the trunk in such a way that you have to remove it to check the tire pressure."

M. C. LEHMAN, Berne, Ind.

Sounds like a valve sticking. Have the valve system checked for tight guides, or look for a reason for the rocker arms not following the cam action smoothly. You can overcome the poor trunk design by purchase of a valve-stem extension which will let you check the spare normally.

"I have a '64 Chevelle with a 283-inch engine and four-speed transmission. It has had three clutches in two months, and develops a vibration at about 35 m.p.h. and up. Any suggestions?"

REX CONWAY, Whittier, Calif.

You're putting in the wrong clutch for the way you use the car. Put in a new Corvette high-performance clutch and pressure-plate assembly. Adjust the throw-out bearing clearance properly. Check the flywheel and pressure plate for balance, mounted together. Then, check the motor mounts, drive shaft, and pinion angle to specs.

Got a question on autos? Send it to:
"Say, Smokey—" POPULAR SCIENCE
355 Lexington Ave., New York, N.Y. 10017.
Not every question may be used. Questions cannot be answered by individual letters.

Copyrighted material

Plymouth Dodge Chrysler Imperial

The only American-made cars with a 5-year/50,000-mile warranty.

HERE'S HOW CHRYSLER CORPORATION'S 5-YEAR/50,000-MILE ENGINE AND DRIVE TRAIN WARRANTY PROTECTS YOU: CHRYSLER CORPORATION WARRANTS FOR 5 YEARS OR 50,000 MILES, WHICHEVER COMES FIRST, AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP AND WILL REPLACE OR REPAIR AT A CHRYSLER MOTORS CORPORATION AUTHORIZED DEALER'S PLACE OF BUSINESS, WITHOUT CHARGE FOR REQUIRED PARTS AND LABOR, THE ENGINE BLOCK, HEAD AND INTERNAL PARTS, INTAKE MANIFOLD, WATER PUMP, TRANSMISSION CASE AND INTERNAL PARTS (EXCLUDING MANUAL CLUTCH), TORQUE CONVERTER, DRIVE SHAFT, UNIVERSAL JOINTS, REAR AXLE AND DIFFERENTIAL, AND REAR WHEEL BEARINGS OF ITS 1966 AUTOMOBILES, PROVIDED THE OWNER HAS THE ENGINE OIL CHANGED EVERY 3 MONTHS OR 4,000 MILES, WHICHEVER COMES FIRST, THE OIL FILTER REPLACED EVERY SECOND OIL CHANGE AND THE CARBURETOR AIR FILTER CLEANED EVERY 6 MONTHS AND REPLACED EVERY 2 YEARS, AND EVERY 6 MONTHS FURNISHES TO SUCH A DEALER EVIDENCE OF PERFORMANCE OF THE REQUIRED SERVICE, AND REQUESTS THE DEALER TO CERTIFY (1) RECEIPT OF SUCH EVIDENCE AND (2) THE CAR'S THEN CURRENT MILEAGE.

The warranty is good for 5 years or 50,000 miles. The repairs or replacements it covers are made without charge—parts *and* labor. It's the longest, strongest protection ever offered by any American car manufacturer. And because the warranty is transferable from owner to owner, it can mean more money when you trade. Why settle for less?

Copyrighted material

KEEP PACE WITH SPACE AGE! SEE MANNED MOON SHOTS, SPACE FLIGHTS, CLOSE-UP!

AMAZING SCIENCE BUYS
for FUN, STUDY or PROFIT

SCIENCE FAIR HEADQUARTERS! FREE! CATALOG

See the Stars, Moon, Planets, Close Up!
3" ASTRONOMICAL REFLECTING TELESCOPE

60 to 180 POWER! Famous Mt. Palomar Type! An Unusual Buy!
See the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, phases of Venus. Equatorial Mount with lock on both axes. Aluminized and overcoated 3" diameter high-speed f/10 mirror. Telescope equipped with a 60X eyepiece and a mounted Barlow Lens. Optical Finder Telescope included. Hardwood, portable tripod. FREE with Scope: Valuable STAR CHART plus 272-page "HANDBOOK OF HEAVENS" plus "HOW TO USE YOUR TELESCOPE" BOOK.
Stock No. 85,050-N ..... $29.95 Postpaid

4¼" Reflecting Telescope—up to 225 Power
Stock No. 85,105-N ..... $79.50 F.O.B.

Superb 6" Reflector Telescope
Up to 576 Power. Equatorial mount and Pedestal Base.
Stock No. 85,086-N ..... $199.50 F.O.B.

Precision Marine Time Piece Afloat or Ashore
SHIP'S BELL CLOCK

Handsome metal case in either brass or chrome. Highly corrosion resistant for use on shipboard or home. Finely made, unusually high quality. 8-day clock has familiar 1 to 12 dial—also marked with 24-hour system of timekeeping and traditional watch periods from Evening (or First) Watch through Second Dog Watch. Chimes nautical half-hour intervals from 1 to 8 bells, (can be turned off). Thermometer at bottom of dial. Wt. 6 lbs.
Stock No. 70,781-N Brass ..... $60.00 Ppd.
Stock No. 70,782-N Chrome ..... $60.00 Ppd.

OPAQUE PROJECTOR

Projects illustrations up to 3" x 3½" and enlarges them to 35" x 30" if screen is 6½ ft. from projector; larger pictures if screen is further away. No film or negatives needed. Projects charts, diagrams, pictures, photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current, 6-ft. extension cord and plug included. Operates on 60-watt bulb, not included. Size 12" x 8" x 4½" wide. Weight 1 lb., 2 oz. Plastic case with built-in handle.
Stock No. 70,199-N ..... $7.95 Postpaid

OPAQUE PROJECTOR with KALEIDOSCOPE ATTACHMENT
Same unit as above, but provides endless additional projects with everchanging kaleidoscope patterns.
Stock No. 70,714-N ..... $10.00 Ppd.

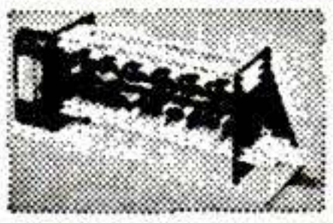
BINOCULAR-TO-CAMERA HOLDER
Will Fit Any Camera

For Exciting Telephoto Pictures
Bring distant objects 7 times nearer with a 35-mm camera. 7x50 binocular and our NEW CAMERA-TO-BINOCULAR HOLDER. Ideal for long range photos of wild life, ships, people, planes, etc. Camera and binoular attach easily. Use any binocular or monocular—any camera, still or movie. Take color or black and white shots. Attractive gray crinkle and bright chrome finish. 10" long. Full directions for taking telephotos.
Stock No. 70,223-N ..... $11.50 postpaid

'FISH' WITH A WAR SURPLUS MAGNET

Go Treasure Hunting On The Bottom
Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Troll it along the bottom—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Alnico V Type—Gov't. Cost, $50. Lifts over 150 lbs. on land—much greater weights under water. Order now and try this new sport.
Stock No. 70,571-N 5 lb. Magnet ..... $12.50 Postpaid
Stock No. 70,570-N 3½ lb. Lifts 40 lbs. ..... $8.75 Postpaid
Stock No. 85,152-N 15 lb. size, lifts 350 lbs. ..... $33.60 FOB

SOLVE PROBLEMS! TELL FORTUNES! PLAY GAMES!
NEW WORKING MODEL DIGITAL COMPUTER
ACTUAL MINIATURE VERSION OF GIANT ELECTRONIC BRAINS



Fascinating new see-through model computer actually solves problems, teaches computer fundamentals. Adds, subtracts, multiplies, shifts, complements, carries, memorizes, counts, compares, sequences. Attractively colored, rigid plastic parts easily assembled. 12"x3½"x4¾". Incl. step-by-step assembly diagrams, 32-page instruction book covering operation, computer language (binary systems), programming, problems and 15 experiments.
Stock No. 70,683-N ..... $5.98 Postpaid

MAIL COUPON for FREE CATALOG "N"

EDMUND SCIENTIFIC CO., Barrington, N.J.
Completely New 1966 Edition. 148 Pages.
Nearly 4000 Unusual Bargains
Please rush Free Giant Catalog-N.

Name.....

Address.....

City.....Zone.....State.....

NEW! SCIENCE FAIR PROJECT KITS
Edmund Kits are carefully planned to give any boy or girl the fun and excitement of discovering science facts. Such carefully planned projects can lead the student to awards or scholarships. Adults too will find them an excellent introduction to the various fields of science. **Write for Free Bulletin 47-N "Your Science Project" covering all phases of Science Fair projects.**

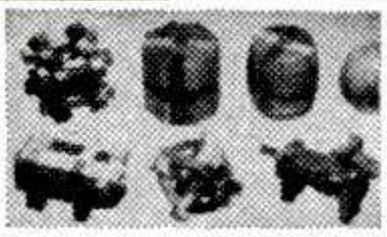
MINIATURE WATER PUMP

Wonderful for experiments, miniature waterfalls, fountains, Christmas gardens, HO gage railroad backdrops, hobbyists, labs, schools. Pumps continuous flow of water etc. Tiny (2⅝" x 1¾") electric motor and pump ideal for hobbyists, labs, schools. Pumps continuous flow of water at rate of one pint per minute at a 12" head. With 2 D Batteries in series will pump to 24" high. Works in either direction. **Stock No. 50,345-N ..... $2.25 Postpaid**

BUILD A SOLAR ENERGY FURNACE

A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! Use scrapwood! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens 11" sq. F.L. 19".
Stock No. 70,533-N ..... $6.00 Postpaid

WOODEN SOLID PUZZLES



12 Different puzzles that will stimulate your ability to think and reason. Here is a fascinating assortment of wood puzzles that will provide hours of pleasure. Twelve different puzzles, animals and geometric forms to take apart and reassemble, give a chance for all the family, to test skill, patience, and best of all to stimulate ability to think and reason while having lots of fun.
Stock No. 70,205-N ..... $3.00 Postpaid

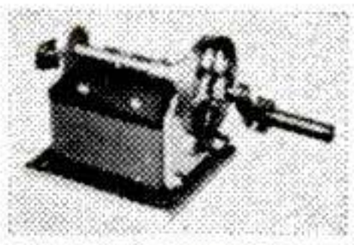
Brand New, Quick-Charge, Industrial Surplus
NICKEL-CADMIUM BATTERY
Unparalleled Value

For the first time a 6-volt, light-weight nickel-cadmium battery in stainless steel, strap type casing, 4-amp hour capacity. Almost unlimited life—thousands of discharge-charge cycles with minute deterioration—charges fully in approx. 1 hr. with Edmund charger kit. Just a few drops of water per year provide full maintenance. Hundreds of uses for hobbyists, amateur photographers, campers, model builders, etc. Unequalled for rechargeable lanterns; cycle scooters, and boat lights; portable fluorescent and ultra-violet lights; electronic flash units. Battery requires minimum of electrolyte; is sealed to prevent loss; delivers nearly 100% of output at below freezing temperatures compared to 50% by lead-acid batteries. No corrosive fumes under any stage of recharge. Can't be damaged by accidental charge in reverse (but not recommended). Stud type terminals on top 1⅛" apar, marked for polarity; 6/32 thread, nuts and lock-washers. 6"x2"x4". Wt. approx. 2 lbs.
Stock No. 70,776-N ..... $15.00 Ppd.
CHARGER KIT FOR 6-VOLT BATTERY. Charges in approx. 1 hr. Shuts off automatically, attaches to Stock No. 70,766 battery case. Includes transformer, ballast resistors, charger circuit board, mounting hardware, 8-ft. cord, plug switch, assembly instructions.
Stock No. 79,807-E ..... $8.00 Ppd.
ONE 1.2 VOLT NICKEL-CADMIUM CELL
Stock No. 40,798-N ..... $3.95 Ppd.

SCIENCE TREASURE CHESTS
For Boys—Girls—Adults

Science Treasure Chest—Extra-powerful magnets, polarizing filters, compass, one-way-mirror film, prism, diffraction grating, and lots of other items for hundreds of thrilling experiments, plus a Ten-Lens Kit for making telescopes, microscopes, etc. Full instructions included.
Stock No. 70,342-N ..... $5.50 Postpaid
Science Treasure Chest DeLuxe—Everything in Chest above plus exciting additional items, for more advanced experiments including crystal-growing kit, electric motor, molecular model set, first-surface mirrors and lots more.
Stock No. 70,343-N ..... $10.50 Postpaid

WAR SURPLUS ELECTRIC GENERATOR



Brand new Signal Corps Electric Generator for scientific experiments, electrical uses, demonstrations. Generates up to 90 volts by turning crank. Use in high impedance relays. Charge ground and bring up night crawlers for bait or study. 2 Amico Magnets alone worth original price. Wt. 2 lbs. Cost to Govt. $15
Stock No. 50,225-N ..... $6.95 Postpaid
Same type generator, mounted, with light, as electricity demonstrator.
Stock No. 50,365-N ..... $11.95 Postpaid

MAKE YOUR OWN POWERFUL ASTRONOMICAL TELESCOPE
Kits contain fine annealed pyrex mirror blank, abrasives, diagonal mirror and eyepiece lenses. You build instruments ranging in value from $75.00 to hundreds of dollars.

Stock No.	Diam.	Mirror Thickness	Price
70,003-N	4¼"	¾"	$ 7.50 ppd.
70,004-N	6"	1"	11.95 ppd.
70,005-N	8"	1⅜"	19.50 ppd.
70,006-N	10"	1¾"	30.75] f.o.b.
70,007-N	12½"	2⅛"	59.95] Barrington

ORDER BY STOCK NUMBER SEND CHECK OR MONEY ORDER SATISFACTION GUARANTEED
EDMUND SCIENTIFIC CO., BARRINGTON, N. J.

Copyrighted material

Science Newsfront

Last-minute news and notes to keep you up-to-date

By W. STEVENSON BACON

Astronauts to fly in "office chair"

A rocket-powered "office chair" may be the vehicle our astronauts will use to travel over the moon. Still under wraps, the Lunar Flying Chair—which looks like an ordinary office chair except for the controls on the arms—is undergoing development by Bell Aerosystems, and uses the same propulsion system as the rocket belt announced by Bell some years ago. The "chair" would fly up to 100 feet above the moon's surface.

No-wheel-drive vehicle

You've heard of two- and four-wheel drive, but no-wheel drive? It's completely practical, claims Dr. Arthur W. Farrall of Michigan State University, who recently demonstrated a working model. Called an "inertia propulsion vehicle," his device uses movable weights and operates on two cycles. An engine turns a cam during the cocking stroke, pushing a weight slowly forward and tightening a spring to which it is attached. During the power stroke, the cam releases the weight, and the spring snaps it back, providing the force to move the vehicle forward. Possibilities include cars that would never slip, tanks that could conquer the toughest terrain, and a tow truck that could move almost anything.

New artificial kidney may be implanted

An artificial kidney machine so small that it could be implanted in the body, or at least be made portable, is now possible according to some authorities. Extremely fine, hollow fibers being perfected by the government for use in sea-water-desalinization plants hold the key. The permeable fibers would be used as "capillary membranes," greatly increasing the membrane surface area while reducing the amount of blood circulating out of the body into the artificial kidney. The new machine, reported by *Medical World News*, would represent a giant step forward in saving the lives of patients with kidney ailments.

Good-bye to money?

The universal identification card that replaces money and checks has become a reality in Wilmington, Del., for customers of a retailing chain who also have accounts at the Bank of Delaware. Starting recently, customers were given a plastic card with holes punched in it. At stores where it can be used, the card is simply inserted in a Touch-Tone card-dialing telephone where it dials the bank's computer, which records details of a sale. The computer then debits the customer and credits the store.

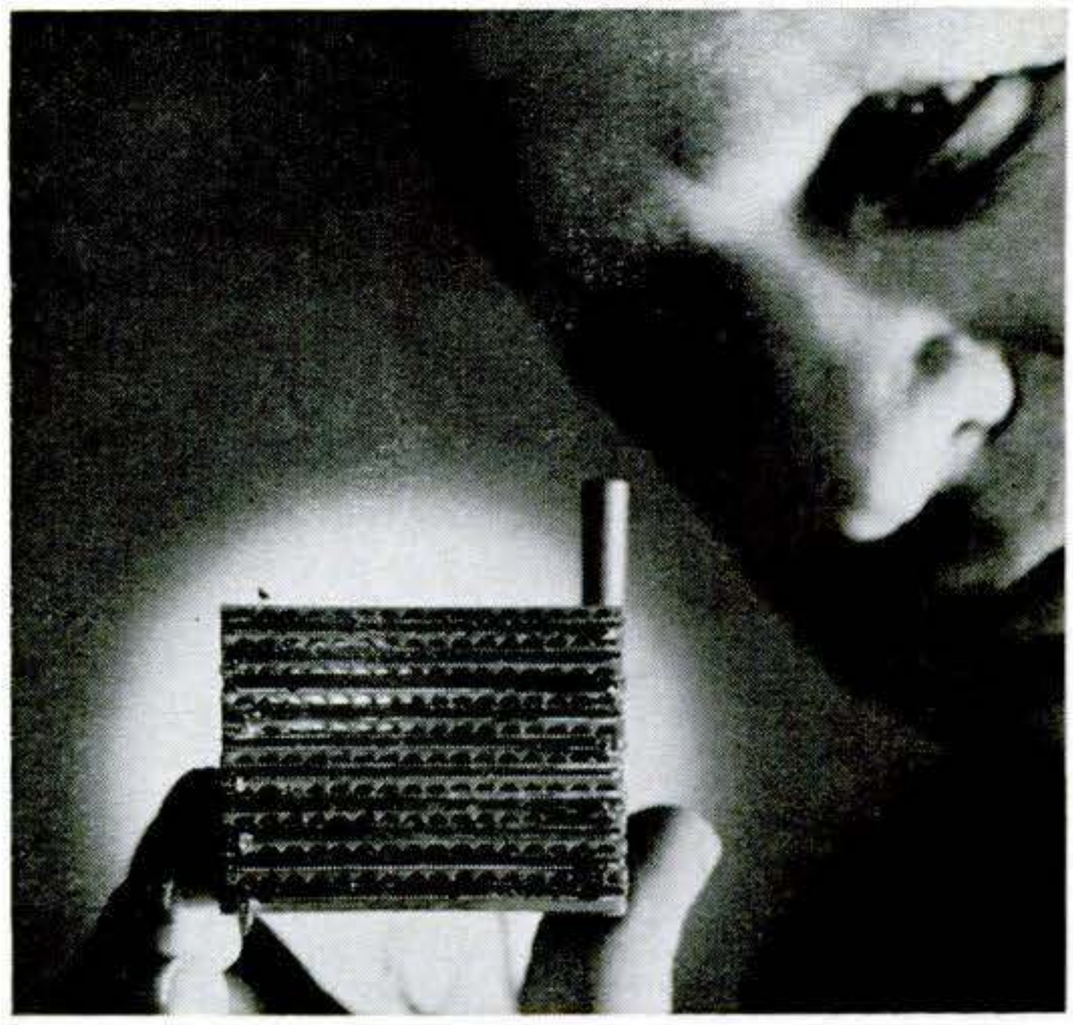
Computer fixes water pipes

"Water hammer," that annoying knock, knock of a liquid moving through pipes, can now be cured—at least in the case of rocket engines, nuclear submarines, massive hydroelectric and other plants. The destructive pounding is stopped by analyzing the system with a computer, then setting in valves to relieve pressure waves, says Dr. Victor L. Streeter of the University of Michigan. Unfortunately for the home owner, a computer analysis of an ordinary water system would be very expensive.

Electrical current stops rust

Automobile mufflers, toasters, incinerators, and spacecraft have one thing in common: They rust rapidly due to a combination of high temperature, oxygen, and stress. According to Professor W. H. Bruckner of the University of

[Continued on page 32]



Oxygen for astronauts to breathe can be made from their breath and perspiration. A water-vapor electrolysis cell, made by Battelle Memorial Institute, absorbs water in phosphoric acid layers. Electricity-flow between layers breaks it down, frees oxygen.

Copyrighted material

SWORN STATEMENT FROM CHAS. LEMMING:

"After starting my own business I've averaged $100.00 A DAY —most of it clear profit!"

Here's your chance to start a money-making year 'round business of your own and make the success you've dreamed about

• In a city of less than 50,000, Mr. Lemming started his own business after filling in coupon like one below. He averaged $100 a day during first year, some days $200. F. E. Doran grossed $1050 in single month. Geo. Held grossed $300 in one week.

How much you earn depends largely on you. No special skill, no large investment required for our electric upholstery cleaning machine. Start spare-time until full time justified. Hire helpers as needed.

NO SHOP NECESSARY • You clean upholstered furniture on customers' premises—homes, hotels, motels, etc. Auto upholstering, too. No hauling; operate from your home. Watch business grow as satisfied customers tell friends. Supplies cost little, profits high. We will help you to start and work with you for your success. Training and consulting with experts is available at no extra cost.

OURS IS NOT A LEASE ARRANGEMENT • You are free to operate independently. *You* sign no contract. *You* own the deterger and are *your own boss*...every dollar *you* take in is yours. *You* pay no fees, or dues, or royalties, and enough supplies come with it to return far more than your investment. Many earn the cost of the deterger in a week or two. It costs nothing to get details...write **TODAY.**

VON SCHRADER MFG. CO. 211 "D" PL., Racine, Wisconsin

Send at once (no obligation) your **FREE** booklet containing information about your ELECTRIC UPHOLSTERY DETERGER and how I can start *my own* permanent, profitable business.

Name_____

Address_____

City_____ State_____ Zip_____

READ WHAT SOME OF OUR ASSOCIATES SAY

ROY NELSON, Indiana • "I'm doing real well with the Upholstery Deterger. I grossed $204 in four days last week. Everyone is very well satisfied."

F. C. NEWMAN, Pennsylvania "My Von Schrader method beats anything we have here for competition."

BILL RICE, Florida • "Certainly your equipment is better than anything on the market. I know and so do my customers."

HOMER KENDALL, Indiana "Your training, business helps and all have gone a long way in making my business the success it is."

JIM KOVATS, Rhode Island "I just washed some upholstery that had been slip covered and was very dirty. After I was through they decided to discard the slip covers because they said the upholstery looked like new. Let me commend you on the wonderful job that you are doing in getting people started in this lucrative business."

BOB RUSSELL, Florida • "Your Upholstery Deterger does a better job than any other equipment on the market. I recently got contracts from the two largest motels in the area. They had been cleaned in the past by one of my competitors with different type machines. I got the job through recommendations from my satisfied customers."

VERNE GOODALL, Illinois "I would like to tell you about one of my customers. While I was cleaning his furniture, he called up four friends and I got three orders out of the four calls. I am pleased with the way business is going and so are the people I have done work for."

SEND COUPON TODAY!

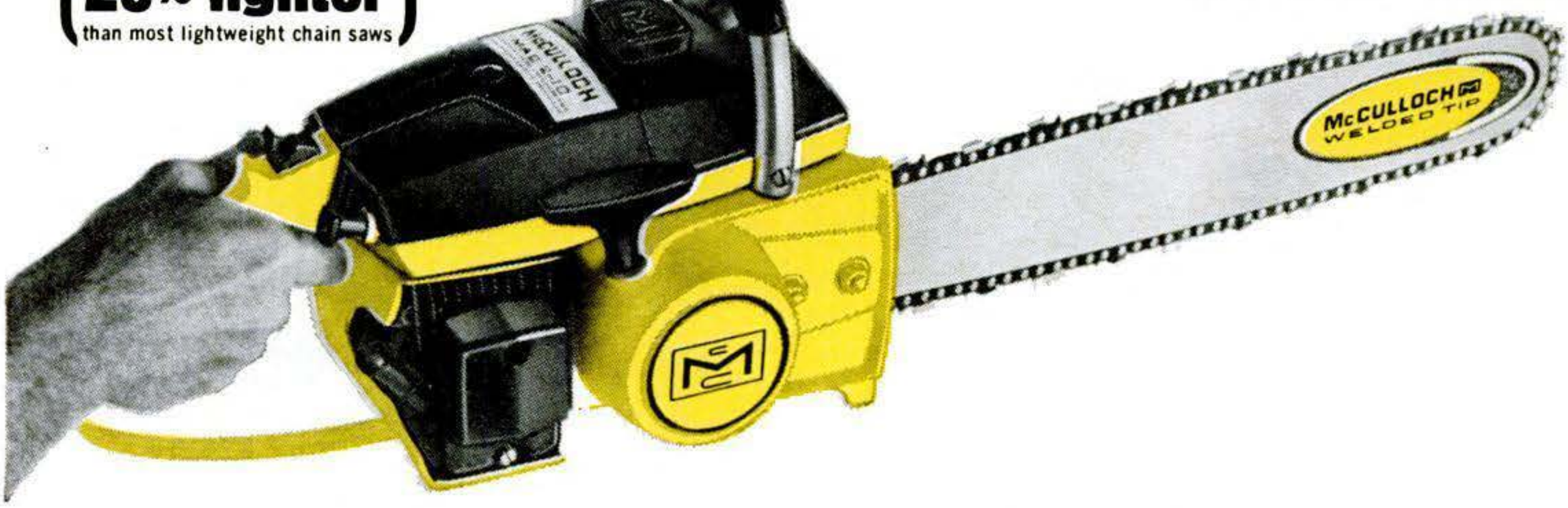
VON SCHRADER MFG. CO.

Copyrighted material

PULPWOOD PROFITS · TRIMMING TREES · CLEARING LAND · TRACTORS · BUILDING A CABIN · PRUNING ORCHARDS · PLACES · CUTTING FIREWOOD · BUILDING A · BUILDING OUTDOOR FURNITURE · BLAZING A TRAIL

On July 1, 1965, the new McCulloch MAC-10 Series made every other lightweight chain saw overweight and out-of-date

(25% lighter)
than most lightweight chain saws



MAC 1-10: The world's lightest direct drive chain saw. **10½ lbs.***
MAC 2-10: World's lightest automatic oiling chain saw. **10¾ lbs.***

If you know you need a chain saw to do any of the hundreds of wood cutting jobs one can do, now's the time to act. And if you've never thought about owning a chain saw, it's time to find out how handy a new, fast-cutting MAC-10 Series chain saw is to have around. The MAC-10 Series saws are up to one-quarter lighter than other lightweights, but have features and advantages that you'd expect only on much heavier saws. Larger capacity fuel and oil tanks, for instance, that keep MAC-10's running for a full half hour or even longer. A new, exclusive idle-governor that prevents stalling, and a fingertip primer that makes fast, sure starts. Extra strong internal parts, for long, dependable life. And, of course, the McCulloch trademark that is your guarantee of the best chain saw you can buy, any size, any price, for any job. Let your McCulloch Dealer show you the MAC-10's now. Or write for your full color McCulloch chain saw catalog: McCulloch Corp., Dept. PS, 6101 West Century Blvd. Los Angeles, California 90045.

Prices and specifications subject to change without notice or obligation.

*Engine weight only, dry, less bar and chain.

McCULLOCH
CHAIN SAWS · OUTBOARDS
LEADERSHIP THROUGH CREATIVE ENGINEERING

Copyrighted material

AUDEL

FIX ANY CAR *FAST!*

ALL-NEW

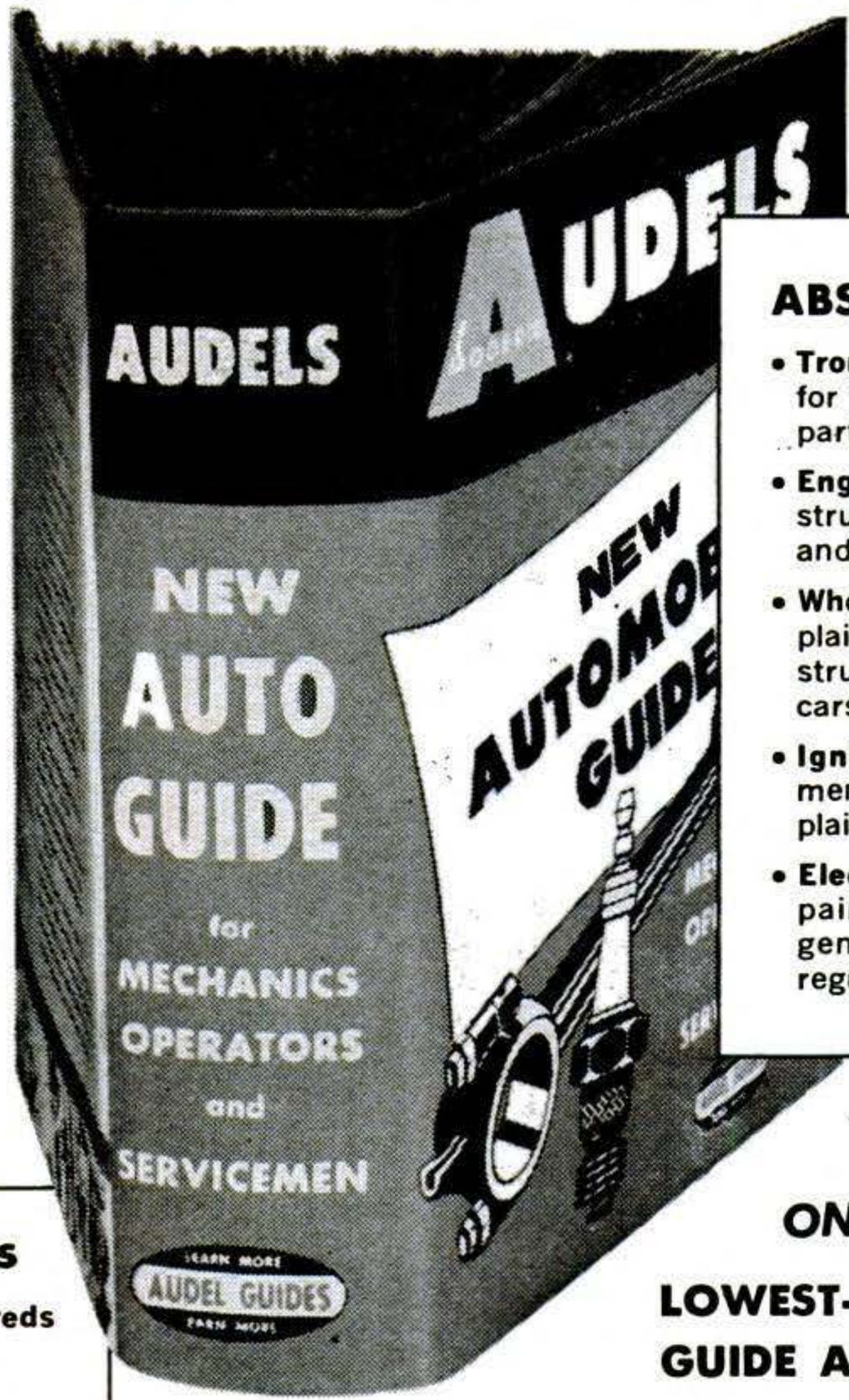
NEW FROM COVER TO COVER...

Here is all the latest basic know-how you need to repair any part or system in any make or model car...*easier and faster!*

AUTO GUIDE

1966 EDITION

Most instructive auto repair guide available today! Explains in easy-to-understand detail every single part of the automobile. Describes trouble symptoms you may come up against in every part or system. Tells you the probable cause of the trouble, then shows you step-by-step how to repair, overhaul, or rebuild the defective part or system. You do the work faster, easier, and it turns out right!



736 PAGES

EVERY DETAIL ILLUSTRATED

ABSOLUTELY COMPLETE!

- **Troubleshooting**—latest techniques for fast location of trouble in any part or system
- **Engine Tune-Up**—step-by-step instructions for electrical, mechanical, and ignition tune-up
- **Wheel Balancing & Alignment**—explains principles; gives detailed instructions for all modern domestic cars
- **Ignition Systems**—covers all elements; explains use of testers; explains latest transistor systems
- **Electrical Systems**—operation, repair, and adjustment of lighting, generators, starters, alternators, regulators, and batteries

Brand-New Features

- **Complete charts, showing hundreds of trouble symptoms, the most likely causes, and the right procedure to repair the trouble.**
- **Describes, illustrates, and tells you how to use the special tools required to do the repair job. Helps you work like a factory-trained and equipped mechanic.**
- **Shows you a complete, practical method for fast, successful trouble-shooting and repair of any car.**

ONLY $6.95

LOWEST-COST AUTO REPAIR GUIDE AVAILABLE TODAY!

Twenty-Seven Fact-Packed Chapters Cover Everything:

Troubleshooting—symptoms and causes • Engine Tune-up • Spark Plugs • Storage Batteries • Distributors • Ignition Testing • Starters and Generators • Lighting Systems • Tire Servicing • Brakes • Power Brakes • Front Suspension • Steering Systems • Front-Wheel Alignment • Chassis, Springs and Shocks • Fuel Pumps • Carburetors • Cooling Systems • Engine Lubricating Systems • Pistons and Rings • Crankshafts and Connecting Rods • Camshafts • Valves • Manual Transmission and Clutches • Automatic Transmissions • Drive Shafts and Universal Joints • Rear-Axle Assemblies—ABSOLUTELY EVERYTHING YOU SHOULD KNOW TO FIX ANY CAR!

SPECIAL NO-RISK OFFER

Examine the NEW AUDEL AUTO GUIDE for 10 days. Let it help you on any auto repair, tune-up, or maintenance job. You must be satisfied with the book, or you may return it within 10 days for a full refund. Audel's 85-year-old reputation for publishing quality how-to-do-it guides is your best guarantee of practical help.

TRY THIS BOOK

FREE

FOR 10 FULL DAYS

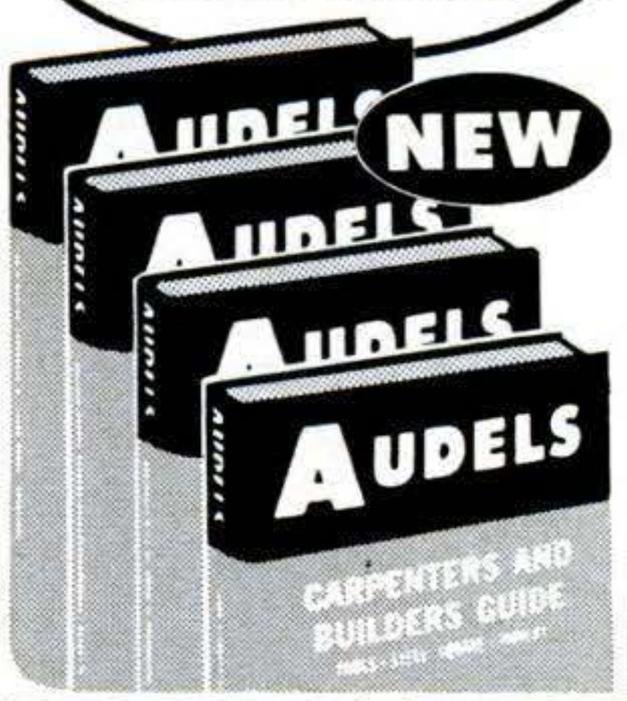
ORDER TODAY— *use coupon on opposite page!*

THEODORE AUDEL & CO.
division of HOWARD W. SAMS & CO., INC.
Indianapolis • New York

Copyrighted material

AUDEL *Skill-Building* PRACTICAL GUIDES

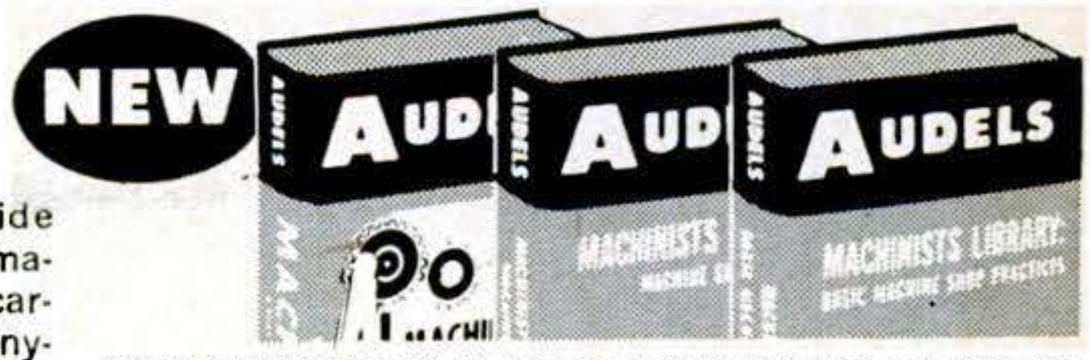
LEARN MORE— EARN MORE!



NEW! CARPENTERS & BUILDERS GUIDES

Four all-inclusive volumes provide latest practical inside trade information on modern construction for carpenters, builders, home owners—anyone wanting to know how to master the carpentry trade. ALL-NEW AND ABSOLUTELY COMPLETE! **Vol. 1**—Tools, Steel Square, Joinery. **Vol. 2**—Builders Math, Drawings, Specifications. **Vol. 3**—Layouts, Foundations, Framing. **Vol. 4**—Millwork, Power Tools, Windows, Doors, Roofing, Flooring. Most practical guide available. Thousands of diagrams, charts, graphs, photos. 1616 pgs. Set $16.95

Circle No. 8 in Coupon



MACHINISTS & TOOLMAKERS GUIDES

Latest shop practices for machinists and toolmakers.

Vol. 1. Basic Machine Shop Practice. Practical fundamentals of machine shop operations. Illus. 416 pages. $4.95
Circle No. 12A in Coupon

Vol. 2. Setup & Operation of Machines. Covers all important types of shop machines. Illus. 512 pages. $4.95
Circle No. 12B in Coupon

Vol. 3. Toolmakers Handybook. Practical data on layouts, jigs, dies, gears, etc. Illus. 384 pages. $4.95
Circle No. 12C in Coupon

All 3 volumes, $13.50—**Circle No. 12N in Coupon**

Home Appliance Service Guide

How to fix refrigerators, washers, ranges, toasters, and all other electric & gas appliances. Fully illus. 608 pages. $6.95
Circle No. 2 in Coupon

Refrigeration and Air Conditioning

Servicing, operation and repair of all systems and machines, freezers, lockers, water coolers, etc. Illus. 1090 pages. $6.00
Circle No. 14 in Coupon

Masons and Builders Guides

Four practical vols. for bricklayers, stone masons, cement workers, plasterers. 2000 illus. 1440 pages. Set $10.50
Circle No. 26 in Coupon

Plumbers & Steamfitters Guides

4 vols. of ready reference for plumbers, steam fitters, gas fitters, sheet metal workers. 3600 ill. 1833 pages. Set $10.50
Circle No. 6 in Coupon

new Electric Library

10 volume electrical encyc. Answers questions on thousands of electrical problems. 9000 ill. 5558 pgs. Set $25.00
Circle No. 15A in Coupon

Welders Guide

Practical guide to theory, operation. Maintenance of all types of electric, oxy-acetylene & Thermit welding. Ill. 608 p. $4.95
Circle No. 10 in Coupon

Practical Electricity

Complete handbook; practical, simplified ready reference on all electrical subjects. 1300 illus. 1052 pages. $5.95
Circle No. 4 in Coupon

TV-Radio Library

Two vols. on TV & radio circuits & how to install and repair all radio and TV including color. Illus. 960 pages. Set $9.50
Circle No. 3 in Coupon

AUDEL PUTS MORE SKILL IN YOUR HANDS— MORE MONEY IN YOUR POCKET!

Diesel Engine Manual

Complete practical guide to modern Diesel engines. Explains principles & how to maintain & oper. Illus. 544 p. $6.00
Circle No. 9 in Coupon

Outboard Motor & Boating Guide

Practical details on all phases of outboard motor repair, maintenance and operation. Up-to-date. Illus. 414 pages. $4.00
Circle No. 49 in Coupon

Mathematics for Mechanics

A complete guide to the mastery of practical math. Simplified method makes learning fast and easy. Ill. 672 pgs. $4.95
Circle No. 11 in Coupon

Sheet Metal Pattern Layouts

Modern guide to all phases of sheet metal work, including pattern development. 350 layouts. Illus. 1152 p. $7.50
Circle No. 29 in Coupon

Blueprint Reading

For mechanics and construction men. Step-by-step explanation of how to read all types of blueprints. Ill. 430 pgs. $3.95
Circle No. 25 in Coupon

Electric Motor Guide

Covers hookups, control, maintenance and troubleshooting of all types of motors. Complete; 617 illus. 1036 pages. $5.95
Circle No. 27 in Coupon

Millwrights & Mechanics Guide

Practical information on plant installation; operation and maintenance data for foremen & workers. Illus. 1248 pgs. $6.95
Circle No. 42 in Coupon

Painting & Decorating Manual

Latest inside trade information for painters, apprentices, home owners. Complete; practical. Illus. 592 pages. $4.95
Circle No. 7 in Coupon

Truck and Tractor Guide

A guide for mechanics, drivers and maintenance men. Gas & Diesel repair, service and operation. Illus. 908 pages. $5.95
Circle No. 5 in Coupon

Wiring Diagrams for Light & Power

Hundreds of typical diagrams illustrated and fully explained. A big help for every electrical worker. 320 pages. $4.00
Circle No. 13 in Coupon

Q & A for Electricians Examinations

A practical book to help you prepare for all electrician licenses. Complete Questions & Answers. 288 pages. $3.50
Circle No. 34 in Coupon

Pumps, Hydraulics, Air Compressors

Three practical books in one complete volume. Latest repair & maintenance data for mechanics. Illus. 1248 pgs. $6.95
Circle No. 40 in Coupon

Foreign Auto Repair Manual

Up-to-date service data for all popular imports: English, French, German, Italian, Swedish. Illus. 592 pages. $5.00
Circle No. 53 in Coupon

Oil Burner Guide

Latest practical book on all home and industrial oil burners. Electrical hookups and wiring data. 320 illus. 420 pgs. $3.95
Circle No. 28 in Coupon

10-DAY FREE EXAMINATION

SEND NO MONEY—Pay the postman nothing! We are glad to send you any of the Audel Guides for absolutely FREE examination in your own home. We take all the risks and leave all the decisions up to YOU. There is no obligation! If you decide to keep the books of your choice you may pay for them under our astounding easy-pay plan of only $3 a month.

HERE IS ALL YOU DO—IT'S EASY TO ORDER: In the *No-Risk* Mail Order Coupon at the right just draw a circle around the number of Audel Guides you want us to send you for FREE EXAMINATION. We will send them to you at once to help you build a brighter future by increasing your SKILL. If you are not COMPLETELY satisfied, return the books, and that will end the matter! NO STRINGS OR CATCHES TO THIS OFFER.

THEODORE AUDEL & CO.
division of HOWARD W. SAMS & CO., INC.
Indianapolis • New York

MAIL THIS NO-RISK COUPON TODAY!

THEODORE AUDEL & CO.—*Self Improvement Publishers Since 1879*—
4300 W. 62nd Street, Indianapolis, Indiana 46206 **S-26**

Please mail me for 10 days' FREE EXAMINATION the books I have circled at right. I agree to mail $3 in 10 days on each book or set ordered, and to further mail $3 a month on each book or set ordered until I have paid the purchase price, plus shipping costs. If I am not completely satisfied with my Audel Guides I may return them.

Name_____
PLEASE PRINT
Address_____
Occupation_____
Employed By_____

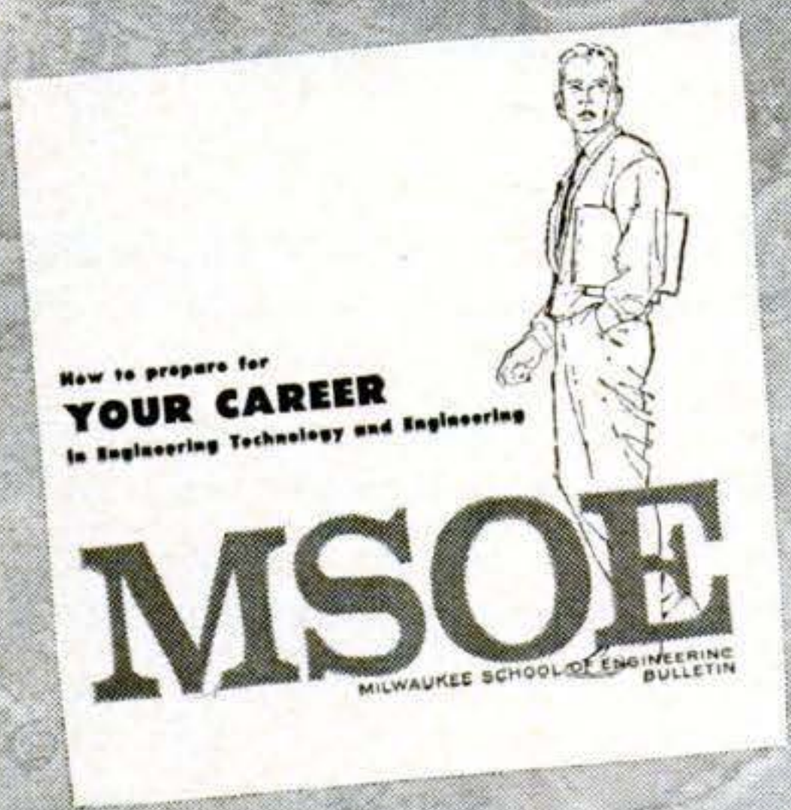
☐ **SAVE SHIPPING COSTS!** Check here if you enclose complete payment with order (plus sales tax, if any). We pay postage charges. You have same return privilege.

1 New Auto Guide			
2	3	4	5
6	7	8	9
10	11	12A	12B
12C	12N	13	14
15A	25	26	27
28	29	34	40
42	49	53	

☐ I have bought Audel books before

Copyrighted material

Thinking of college and a space age career?



Send for this booklet on ENGINEERING TECHNOLOGY AND ENGINEERING

Learn how you can prepare for a dynamic career as an electrical or mechanical engineering technician or engineer in such exciting, growing fields as **avionics, missiles, reliability control, fluid mechanics, data processing, metallurgy, microelectronics, and advanced aerospace research.**

MSOE offers residence study programs leading to these degrees in engineering technology and engineering:

2 years — Associate in Applied Science
4 years — Bachelor of Science

Also get facts about scholarships and financial aids, job placement and other student services, plus photographs of MSOE technical laboratories and student activities. For your copy, just mail the coupon — no obligation.

MSOE

Milwaukee School of Engineering

Milwaukee School of Engineering
Dept. PSM-266, 1025 N. Milwaukee Street
Milwaukee, Wisconsin 53201

Please send the "Your Career" booklet.
I'm interested in

☐ Electrical fields ☐ Mechanical fields

Name.....Age.....

Address.....

City.....State.....ZIP.....

MS-227

Science Newsfront

[Continued from page 27]

Illinois, it may be possible to precondition metals by "prerusting" them in an electric field. When anything made of metal is used as the positive electrode of a circuit that forms an electric field, rusting is greatly reduced and then stops completely. One possible explanation: The current helps the growing oxide layer form a more perfect crystal structure, restricting the movement of ions necessary for further oxidation.

High brake lights found superior

Cars with brake lights mounted at eye level and activated when you take your foot off the accelerator (rather than by the brake pedal) would be safer to drive, according to John Crosley and Merrill J. Allen of Indiana University. The reaction time of drivers following a test vehicle was cut in half with the lights, letting them stop an average of two car lengths farther away at 65 m.p.h.

Planes to use radio-relay satellites

High-quality radio reception on overseas flights, and other benefits such as telephone service for airborne passengers, will result when commercial airliners switch to VHF (very-high-frequency) radio relayed by satellites as their primary means of communication with the ground. High-frequency (HF) radio, currently used on long-distance flights, is plagued by noise, interference, and continuous variations in atmospheric conditions. VHF, on the other hand, is noise-free, but is normally limited in range to line-of-sight communications.

"Hello, I'm a computer!"

By 1980 people will be communicating with computers on the telephone the way they now communicate with each other, say scholars at TEMPO, GE's center for advanced studies. Already in the works, under Air Force sponsorship, is a computer that uses English for input and control, eliminating the need for highly trained programers. Known as Deacon (direct English access and control), the machine will be able to understand sentences fed to it, although its vocabulary will be limited.

How to grow grass—electrically

Buried electric heating cables help make grass grow, keeping both soil and turf in top condition year round, says the USDA's Agricultural Research Service. In recent tests, part of a practice football field was kept thawed during the winter, using various techniques and different types of grasses. The new Civic Center Busch Memorial Stadium at St. Louis will install such a system using plastic-insulated cables placed eight inches deep and one foot apart to heat the soil when outdoor temperature drops below 40 degrees. A mixture of

[Continued on page 40]

Copyrighted material

Bronco: new kind of sports car!

NEW 4-WHEEL DRIVE Bronco takes you where the action is. Deep into woods for hunting, through snow to good skiing, over sandy beaches to where the fishing is best. Plenty of oomph from a smooth six-cylinder powerplant and 4-wheel traction take Bronco wherever you dare to drive it. Transmission is fully synchronized for smooth downshifting. Bronco is a great performer on the road too. No annoying whine in 2-wheel drive, even at highway speeds. You get a soft, sedan-like ride from Bronco's rugged Mono-Beam coil-spring front suspension. Try the Wagon, Roadster or Sports Utility at your Ford Dealer's now. One's just right for you.

New fun one from **Ford**

Copyrighted material

BRAND-NEW

NOW—A BIG, BEAUTIFUL LINE OF OUTBOARDS

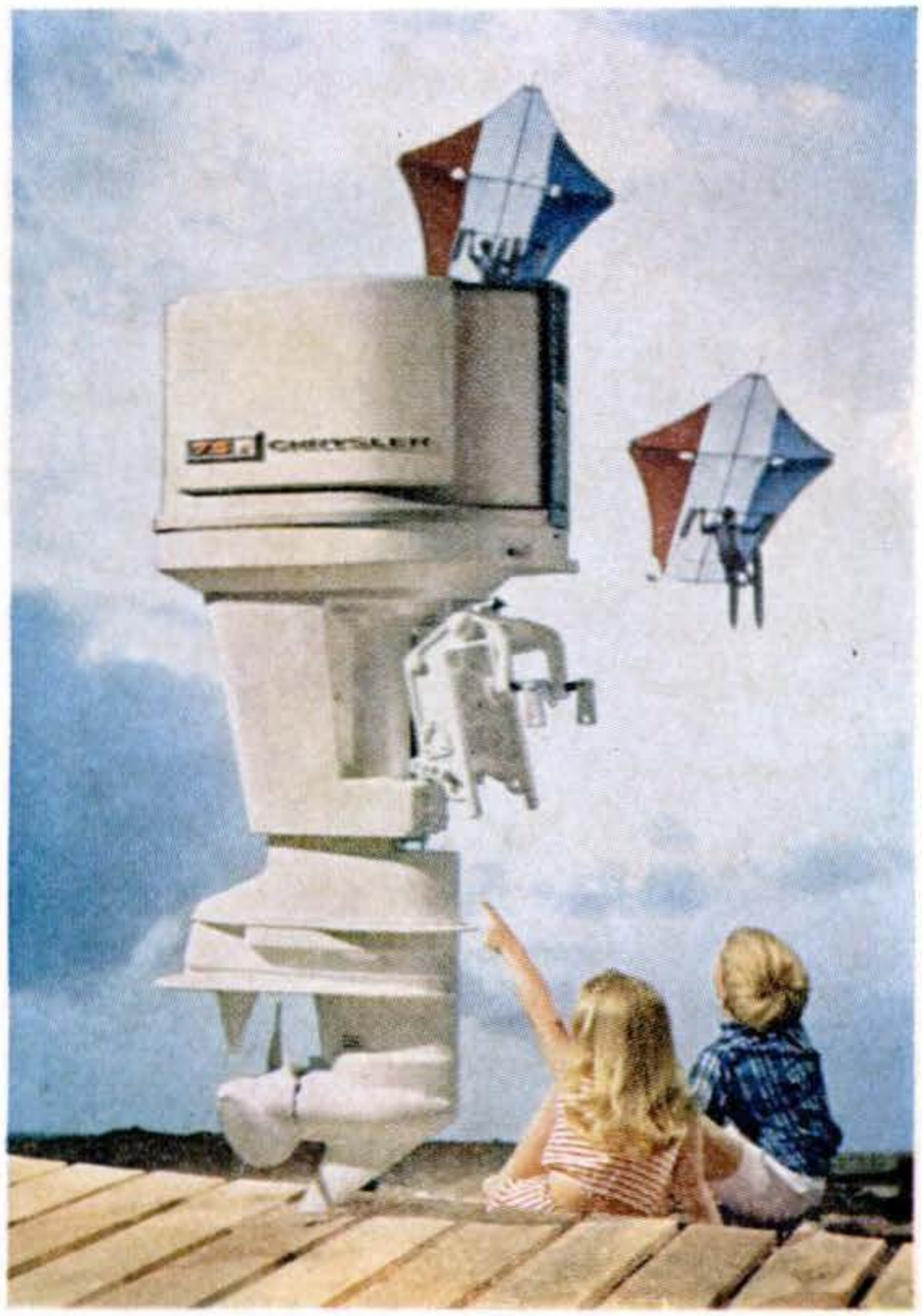
CHRYSLER 105

Want *top power?* Try Chrysler's spectacular 105 (*most powerful outboard ever certified by O. B. C.**). It puts out more than 25 hp. in each of its four mighty cylinders. Packed with premium-quality features: V-reed intake valves, hydraulic shock absorbers, full-length silencing, optional remote controls and power-tilt. Try it! You'll never be happy with less!

*Outboard Boating Club of America—official reporting agency for Boating Industry Association.

CHRYSLER 75

Seventy-five horses of dependable power for action-packed boating fun. New in engineering design, beautifully new in styling. Long-life, "million dollar" baked-enamel finish in snow-white and royal gold. Develops a full 25 horsepower per cylinder, for more power, less weight. Same quality features of Chrysler 105. Hydraulic shock absorbers optional.



Copyrighted material

BRAND:CHRYSLER

FROM THE POWER PEOPLE . . . THE CHRYSLER CREW

CHRYSLER 50

Here's the two-cylinder outboard that delivers a full fifty horsepower. Light weight, of course, for unusually economical operation. Yet it has the rugged dependability you're looking for. Perfect ski-power for light cruisers and run-abouts—you name it. This superb Chrysler outboard is known for its endurance and record-breaking performance the world over.

Here's big news in boating . . . a complete power line of slick, quick outboards, styled and engineered in the Chrysler tradition of leadership. Brand? Chrysler! Reputation? Quality!

Superbly styled in gleaming white and gold, to enhance the good looks of any boat, the new Chrysler line features a broad range of horsepower selections: 3.5, 6, 9.2, 20, 35, 45, 50, 75 and a spectacular 105 (see left). Choose from 21 different models, including two new Chrysler "AUTOLECTRICS"—electric starting 9.2- and 20-horsepower fish 'n fun engines with unique 360° utility light, electric starter-generator and optional remote control.

Before you buy *any* outboard, get the story on America's brand-new brand in outboarding: *Chrysler,* built by the power people. See your nearby Chrysler Outboard dealer today (his name is in your Yellow Pages, under "Outboard Motors"). Chrysler Outboard Corporation, Hartford, Wisconsin.

CHRYSLER
OUTBOARD CORP.

CHRYSLER MARINE PRODUCTS—BOATS, TRAILERS, OUTBOARDS, INBOARDS AND INBOARD-OUTDRIVES

Copyrighted material

The tuned car. For young people of all ages.

What makes a car a car is styling, performance, ride and handling. Only when they're all tuned together is the car a Buick. Like this '66 Wildcat Gran Sport.

We have a secret formula for rejuvenating tired drivers. It's called "Buick tuning."

You know how well your car's engine runs after a tuneup? Buick tuning has the same effect on the whole car. Not just the engine.

Where the tuned car comes from. It comes from ideas, yes. But we don't really trust ideas until we see how they prove out. So we put our ideas in cars and take them out on the road for exhaustive testing.

Do we use orthodox proving grounds? Sure—in Phoenix, Arizona, for example. But since we couldn't tune a car on a proving ground alone (and since you won't be driving on one, either), we don't ship our cars out there. We drive them—testing all the way.

Where else do we test and tune, test and tune? The answer is: everywhere. Anywhere a road can teach us something about the roads you drive. In the mountains—up and down. In New Orleans where the humidity can be fierce. In Bemidji, Minnesota, where the temperature can sag to thirty below.

What the tuned car can do for you. Will a new 325-hp Wildcat make a new driver out of you? We think so. With the 340-hp Wildcat Gran Sport version (it has the larger engine, a special ride and handling package, Positraction rear axle and—naturally—everything tuned to match), you may just find yourself arranging to forget things so you can go back again. Don't blame us. Just think how much fun it will be to feel like you've just gotten your driver's license.

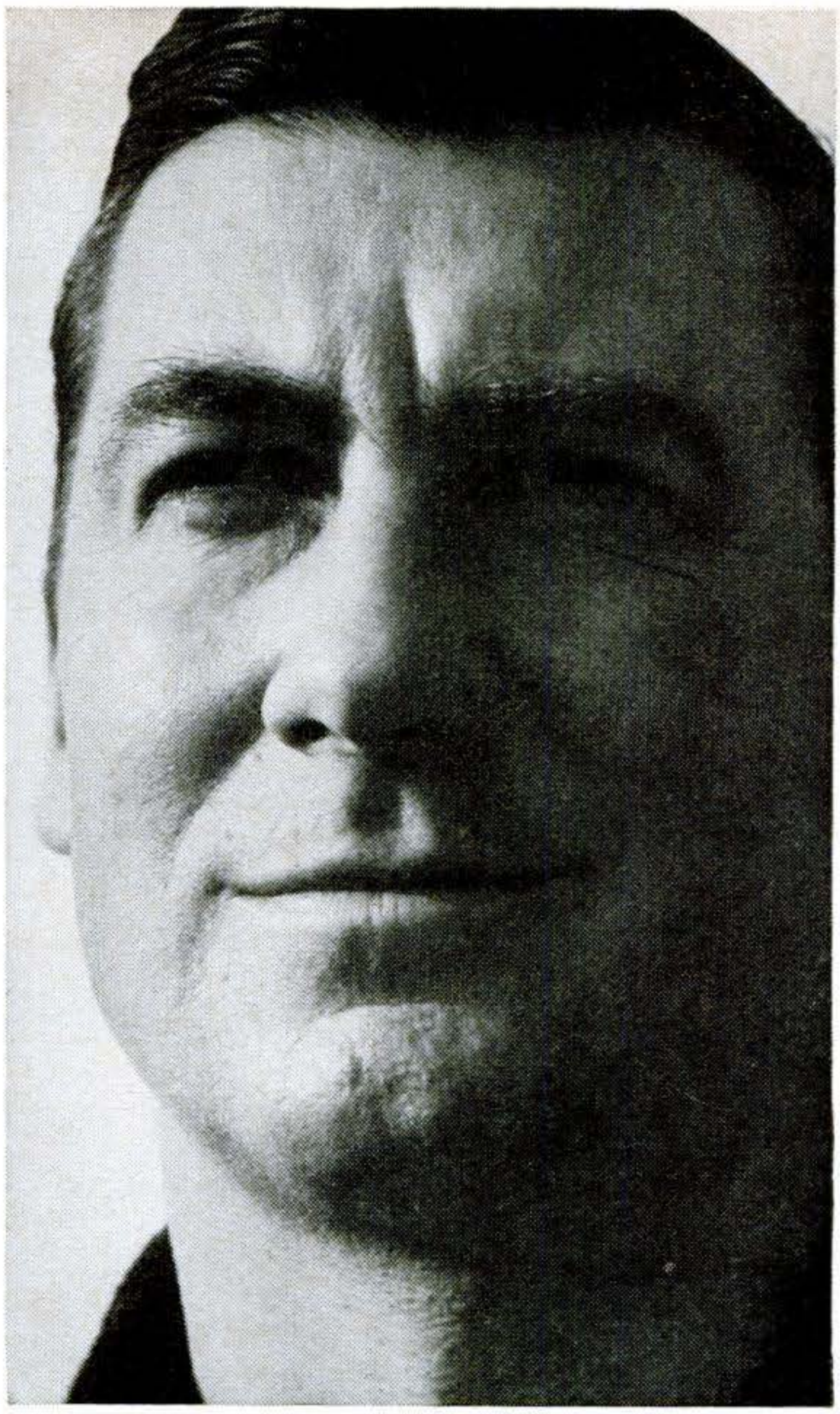
Ah, youth.

Wouldn't you really rather have a Buick?

1966 Buick.
The tuned car.

BUICK MOTOR DIVISION

Copyrighted material



IT TAKES A REAL MAN TO WIN AN I.C.S. DIPLOMA!

Here's training for the man who can take it "straight"—without the fancy trimmings.

With I.C.S., your "classroom" is your home. Your "laboratory" or "shop" is the place you work. Every minute you spend is productive—no commuting, no long-winded discussion groups, no waiting for slower students to catch up.

You gauge your progress not by marks and grades alone but by pay boosts and promotions. And these are likely to come fast.

This is the most demanding kind of training. You select your own subjects, set your own pace, apply what you learn to your own specific needs—all while holding down a full-time job and possibly supporting a family.

Is it any wonder that men who can win I.C.S. diplomas often turn out to be leaders in their fields? I.C.S. has more of its former students now in supervisory and management positions than any other school.

It takes a real man to win an I.C.S. diploma. And the first step is mailing the coupon. Such a simple act sounds easy. Actually, it's the one thing that separates the "planners" from the "plodders." If you're the man we think you are, you'll mail the coupon NOW.

Clip coupon here—and take your first big step to real success! **I.C.S., Scranton, Penna. 18515**

Accredited Member National Home Study Council

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

Dept. 1413, Scranton, Penna. 18515 (In Hawaii: P. O. Box 418, Honolulu. In Canada: I. C. S. Canadian, Ltd. In other countries: I. C. S. World, Ltd.)

Yes, I want to know about how I can get ahead through I. C. S. Rush me FREE Success Kit with 3 valuable booklets: "How to Succeed," opportunity booklet on the field I've checked below, actual sample I. C. S. lesson. (Special WICS booklets for women.) CONVENIENT PAYMENT PLAN.

ARCHITECTURE and BUILDING TRADES
- ☐ Air Conditioning Maint.
- ☐ Architecture
- ☐ Arch. Drawing & Design
- ☐ Building Contractor
- ☐ Carpenter-Builder
- ☐ Carpentry & Millwork
- ☐ Heating & Air Conditioning with Drawing
- ☐ House Planning, Interior Design
- ☐ Reading Arch. Blueprints
- ☐ Refrigeration, Air Conditioning

ART and DESIGN
- ☐ Commercial Art
- ☐ Interior Decorating
- ☐ Sign Painting & Design
- ☐ Sketching & Painting

AUTOMOTIVE
- ☐ Auto Mechanic-Technician
- ☐ Body Rebuilding, Refinishing
- ☐ Electrical Technician
- ☐ Engine Tune-Up
- ☐ Transmission Specialist

BUSINESS
- ☐ Accounting (Canadian)
- ☐ Advertising
- ☐ Business Administration
- ☐ Canadian Business Courses
- ☐ Cost Accounting
- ☐ Gen'l Accounting
- ☐ Industrial Psychology
- ☐ Managing a Small Store
- ☐ Practical Accounting
- ☐ Programming for Digital Computers
- ☐ Programming the 1401
- ☐ Public Accounting
- ☐ Purchasing Agent
- ☐ Real Estate Sales
- ☐ Retail Business Mgmt.
- ☐ Salesmanship
- ☐ Sales Management
- ☐ Traffic Management

CHEMICAL
- ☐ Analytical Chemistry
- ☐ Chem. Engineering
- ☐ Gen'l Chemistry
- ☐ Chem. Lab. Technician
- ☐ Plastics Technician

CIVIL ENGINEERING
- ☐ Civil Engineering
- ☐ Construction Eng'n'r'ng
- ☐ Highway Engineering
- ☐ Sewage Plant Op'r
- ☐ Structural Engineering
- ☐ Surveying & Mapping
- ☐ Water Works Operator

DRAFTING
- ☐ Architectural
- ☐ Drafting Technology
- ☐ Electrical and Electronic
- ☐ Mechanical
- ☐ Structural

ELECTRICAL
- ☐ Appliance Servicing
- ☐ Elec. Eng. Technician
- ☐ Ind. Elect. Technician
- ☐ Motor Repairman
- ☐ Practical Electrician
- ☐ Practical Lineman
- ☐ Reading Electrical Blueprints

ELECTRONICS
- ☐ Electronic Computers
- ☐ Electronics Fundamentals
- ☐ Electronics Technician
- ☐ General Electronics
- ☐ Industrial Electronics
- ☐ Practical Telephony

ENGINEERING (Professional)
- ☐ Chemical ☐ Civil
- ☐ Electrical ☐ Mechanical
- ☐ Math & Mechanics for Engineering

HIGH SCHOOL
- ☐ High School Business
- ☐ High School (Canadian)
- ☐ High School General
- ☐ High School Math
- ☐ High School Secretarial
- ☐ High School Vocational
- ☐ College Preparatory

LANGUAGES (Edited by Berlitz)
- ☐ French ☐ German
- ☐ Italian ☐ Spanish

MECHANICAL and SHOP
- ☐ Gas and Electric Welding
- ☐ Industrial Engineering
- ☐ Ind. Instrumentation
- ☐ Machine Design
- ☐ Machine Shop Practice
- ☐ Quality Control
- ☐ Reading Shop Prints
- ☐ Tool Design

SECRETARIAL
- ☐ Clerk-Typist
- ☐ Professional Secretary
- ☐ Shorthand
- ☐ Stenographic ☐ Typist

STEAM and DIESEL POWER
- ☐ Power Plant Eng'n'r'ng
- ☐ Steam Engineering

SUPERVISION
- ☐ Foremanship-Sup'rv'n
- ☐ Personnel-Lab. Rel'ns

TV-RADIO
- ☐ Radio & TV Servicing
- ☐ Radiotelephone License

MISCELLANEOUS
- ☐ Textile
- ☐ Other (Please specify) _____

Name _____ Age _____
(Please indicate whether Mr., Miss or Mrs.)

Address _____

City _____ State _____ Zip Code _____

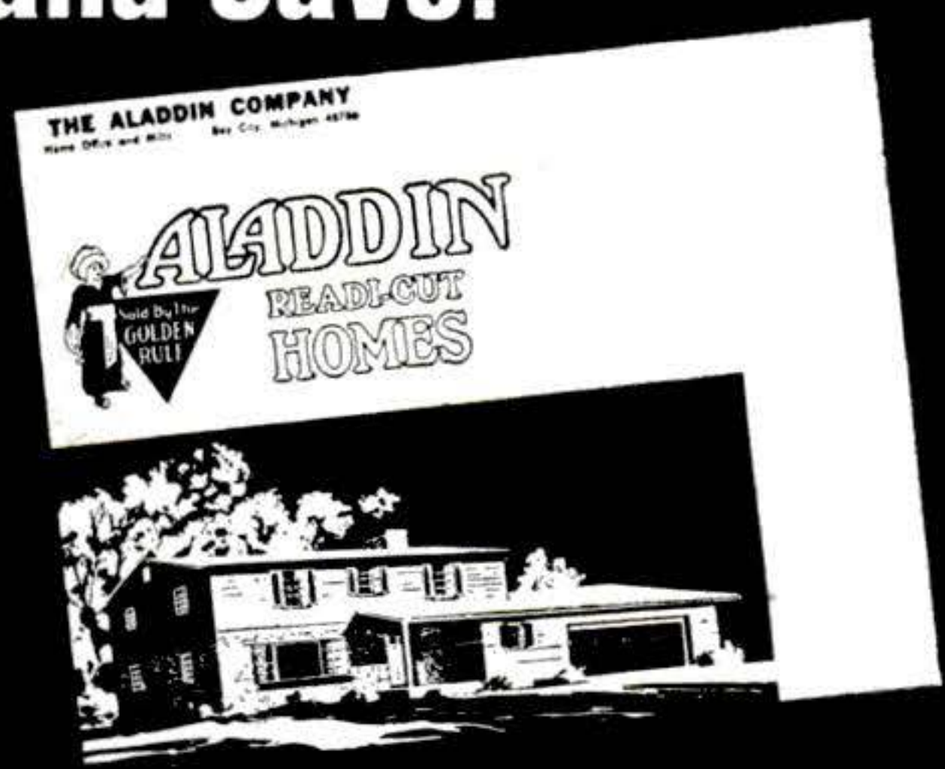
Occupation _____ Employed by _____

☐ **I am a member of U. S. Armed Forces. Send me facts about special low rates.**

Working Hours ____ A.M. to ____ P.M. ***Special Training Programs for Industry***

Copyrighted material

This Big Full Color Book of Homes and Plans Shows You How to Build Your Own Home... and Save!



Aladdin offers:

- **OVER 100 PLANS TO CHOOSE FROM**
- **CUSTOM MANUFACTURING**
- **QUICK-ERECT SYSTEM**
- **QUALITY AND COST CONTROL**
- **QUALITY HOMES FOR LESS**
- **OLD-FASHIONED, FRIENDLY, QUALITY SERVICE—OUR POLICY FOR OVER 60 YEARS**

Don't buy a stapled home when a hand-nailed quality home is available from Aladdin.

Mail to: **The Aladdin Company, 66-15, Bay City, Michigan 48706**

Enclosed find 25¢ for my 64 page catalog of homes and plans.

Name_____

Address_____

City_____ State_____ Zip_____

Over Sixty Years of showing People How to Build their Own Home!

SEND TODAY!

[*Continued from page 32*]

70 to 80 percent zoysia and 20 to 30 percent bluegrass will be used for the turf.

Color dot on package spots spoiled food

You'll never again pick up a package of spoiled meat, fish, or citrus fruit, or a container of sour milk, if a recently invented spoilage indicator is built into the package. It's made in the form of a ½-inch color dot which ranges from a deep blue at "fresh" stage, to a greenish-gray at "spoiling" stage, to a bright yellow when the food is spoiled. Developed by In-Site Corporation of America, the indicator consists of a sensitive material soaked in a blue dye solution and sealed between a transparent outside covering of solid polyethylene and an inside layer of diffusion polyethelene.

Battery for electric cars

There may be an electric car in your future, according to the developers of a compact, lightweight storage battery that will make possible fast, long-range electric autos and trucks. The battery, announced by General Atomic Division of General Dynamics, is a zinc-air cell in which energy is stored in electrochemical form using a zinc-air couple. Energy is produced by converting zinc to zinc oxide. As an example of the tremendous capacity of the new cells, an 850-pound battery pack for a 3,000-pound vehicle would give a range of 200 miles; with ordinary lead-acid cells, this would be just 45 miles.

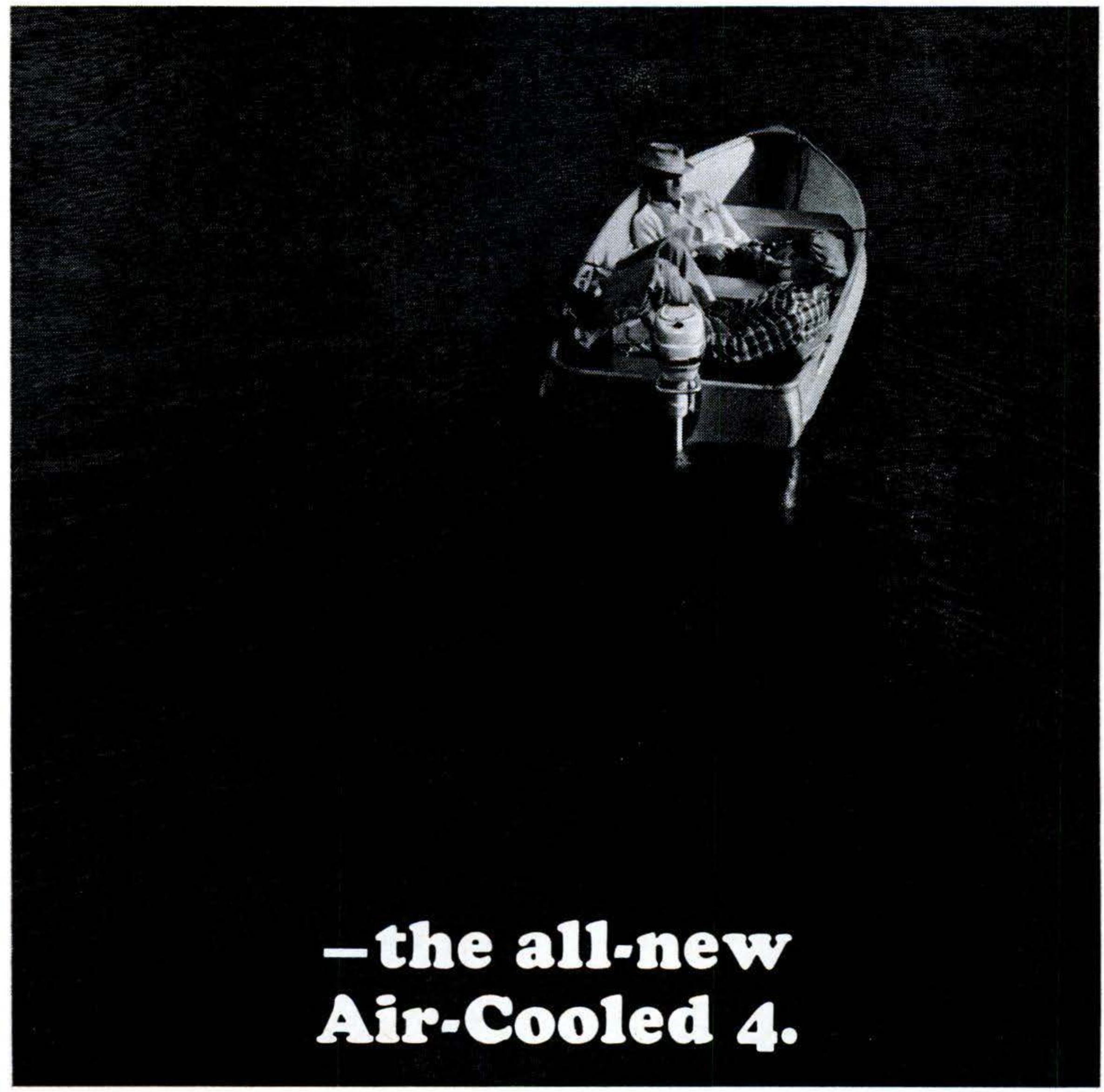
3-D "crystal ball" may cut air collisions

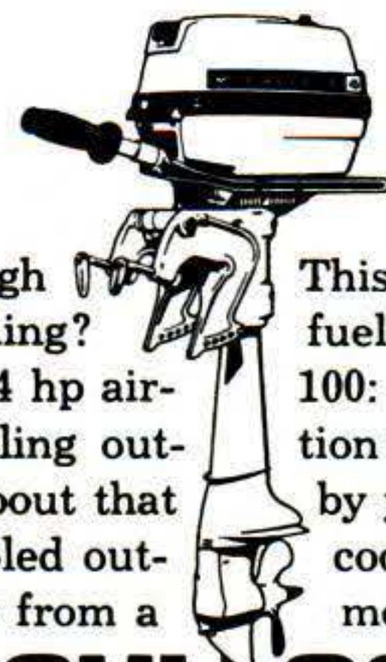
A "crystal-ball" radar tube that represents airplanes as spots of light inside a large glass envelope has been developed to give air-traffic controllers a true 3-D model of surrounding air space. The tube, which you look into—not just at the face—makes use of a large number of fine wires crisscrossed in a mesh. These meshes are then stacked back-to-back in a gas, such as neon, that produces a localized glow in the presence of an electrical charge. A spot of light can be made to appear at any point where two wires cross; electronic switching makes the spots move through three-dimensional paths representing the paths of flying planes. It was developed by Dimensions, Inc.

Electroplated color photos

Long-lasting, stable, brilliant color pictures can now be made without silver. With the new printing method, a special zinc oxide paper is exposed, in turn, to light filtered through blue, green, and red filters, and electroplated in yellow, magenta, and cyan dye baths. A hot-water wash is used between each plating step. The process, Electrocolor, developed by 3M, is just slightly more expensive than conventional color printing. PS

McCulloch announces the world's laziest outboard





Ever see an outboard ho-hum its way through the water at only 450 rpm? And without stalling? No? Then take a look at McCulloch's new 4 hp air-cooled. It's one of the world's slowest-trolling outboards. Gives big, fat fish time to decide about that spinner going by. ☐ The first new air-cooled outboard in years, the 4 gets its dependability from a power head design proven in over 1,000,000 McCulloch chain saws. Portable? The McCulloch 4 tips the scale at just over 37 lbs. Cost? This slow poke is priced with the lowest. And it uses fuel in sips, not gulps. With McCulloch's exclusive 100: 1 fuel/oil ratio, you save on oil, too. Not to mention the cleaner, smokeless operation you get. ☐ Drop by your McCulloch dealer's and check the new air-cooled 4. Next to bait, tackle and boat, it can be the most important piece of fishing gear you ever bought. ☐ While you're at your dealer's be sure to see the other 7 McCulloch outboards. Up to 75 hp, including the great new *electric start* 7½ hp.

McCULLOCH
OUTBOARDS · CHAIN SAWS
LEADERSHIP THROUGH CREATIVE ENGINEERING
LOS ANGELES, CALIFORNIA 90045

ALL SPECIFICATIONS & FEATURES SUBJECT TO CHANGE WITHOUT NOTICE OR OBLIGATION.

Copyrighted material

ACCORDIONS

SAVE ½ Big Discounts

off retail prices of comparable accordions

BUY DIRECT

IMPORTER-TO-YOU PRICES

E-Z TERMS LOW DOWN PAYMENT

Low as $7.95 a month

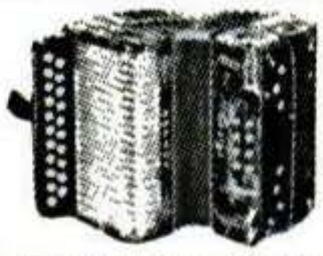
NO RISK 5 DAY HOME TRIAL!

TRY BEFORE YOU BUY!

42 "NEW SOUND" Electronic and Standard Models

Choose your "new sound" accordion from world's biggest selection of Famous Imported Italian Makes . . . for beginners, hobby players, professionals. Totally new styling and startling new features—plus an exciting *new sound! Buy direct* from world's largest dealer at fantastic Importer-to-You savings of ½ or even more. Easy terms . . . low down payment, up to 3 years to pay. NO RISK PLAN—5 Day No Obligation Home Playing Trial. Lifetime performance policy. Satisfaction guaranteed or money back.

FREE BONUS GIFTS for promptness in ordering
E-Z LESSONS • MUSIC PORTFOLIO • MUSIC STAND • DELUXE CASE
YEAR'S SUPPLY OF MUSIC Many More



NOW—Popular "Button Type" Accordions! Full line at discount prices. Check coupon below.

Big discounts on Accordion Amplifiers and Reverb Units. Finest makes—custom designed for Accordions.

FREE! Color Catalogs Selection Guide Discount Prices. Beautiful New Color Swatches

Rush coupon today. Get full details, pictures and low discount prices on over 40 models . . . plus big savings on Amplifiers and accessories. All FREE. No obligation. Write:

MONEY BACK GUARANTEE

TRADE-INS! BIG ALLOWANCE on anything of value!

ACCORDION CORP. of AMERICA, Dept. P-26
5535 West Belmont, Chicago 41, Illinois

FREE Color Catalogs Discount Prices • Rush Coupon

Accordion Corp. of America, Dept. P-26
5535 West Belmont, Chicago 41, Illinois

Send FREE Color Catalogs and Discount prices. Includes special information checked.

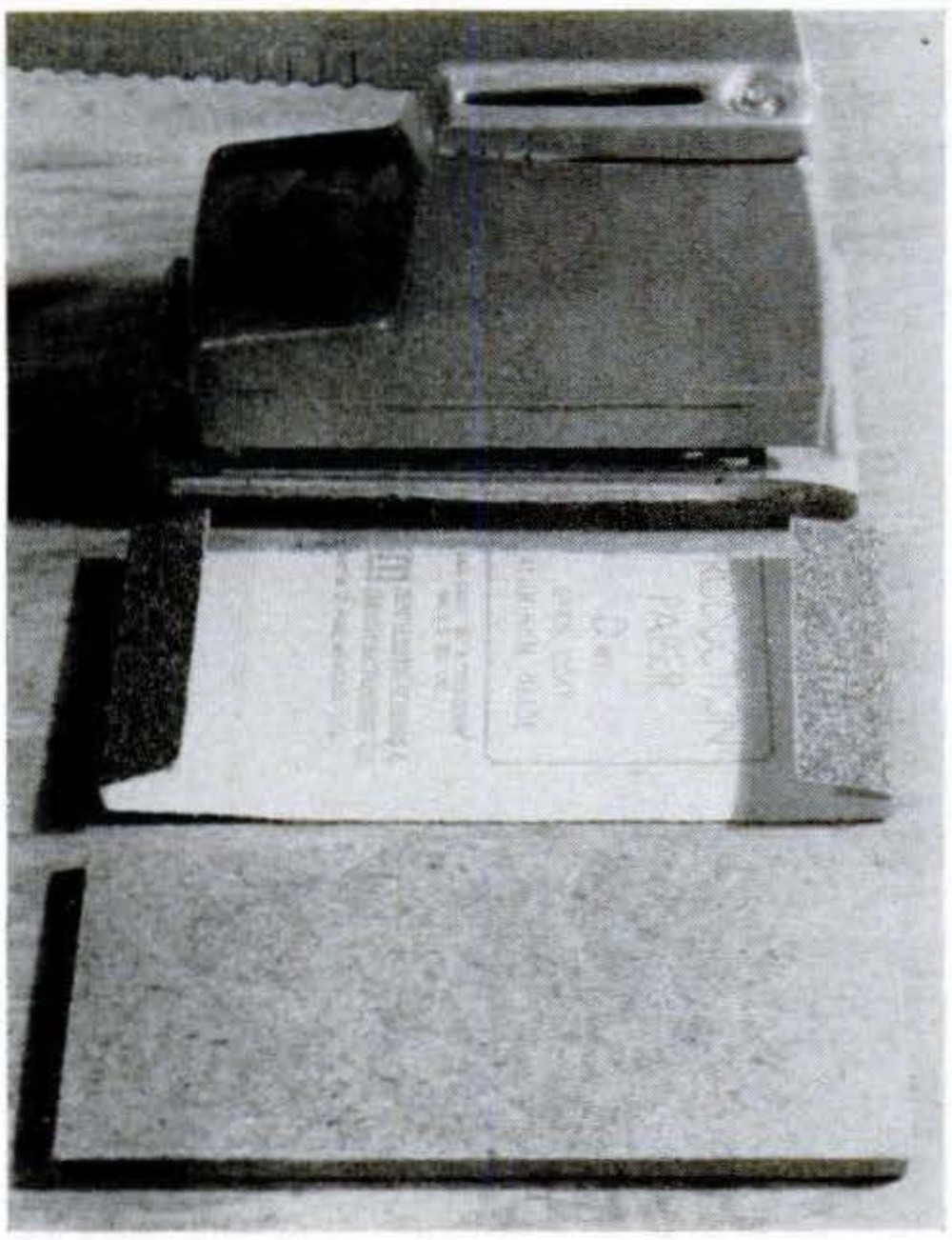
☐ Amplifiers ☐ Button Type Accordions

Name_____

Address_____

City_____ Zone____ State____

☐ I have a trade-in



Pattern forms sandpaper to tight fit

Abrasive paper fitted loosely against the pad of a portable finishing sander wears out quickly and does a poor job. Since putting in paper is a two-handed job, proper tautness can be hard to achieve. It isn't, if you prefold your paper on a ¼" hardboard or plywood pattern the same size as the pad. For heavy-duty sanders, a ⅜"-thick pattern is better. Prefolding not only eases loading and keeps paper straight and taut—it also prevents winding up with too little paper to go under the second clamp.

WILL THOMAS, Buffalo, N.Y.

Coat hooks store extension cords

Occasionally used extension cords are not only hard to find when you want them, but they are often found in a rat's-nest tangle. A simple solution to keeping them handy and neat is a pair of coat hooks. Screw the hooks to the wall or other mounting site as shown above, positioning the lower one upside-down.

KEN PATTERSON
Regina, Sask.

Copyrighted material

Move Up Faster — Make More Money With N.T.S. "PROJECT METHOD" HOME TRAINING

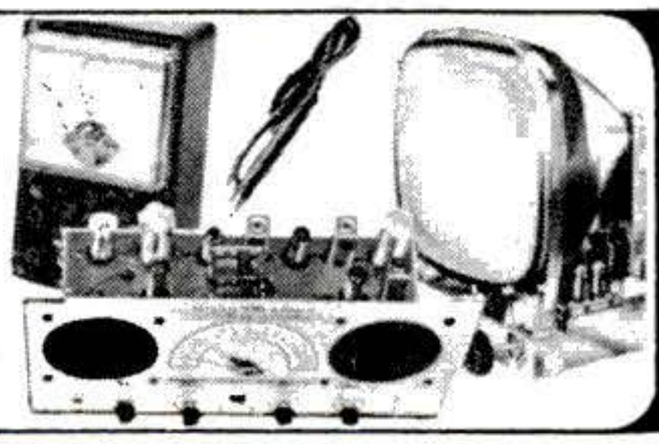
Looking for your first real job in industry? Are you stalemated in a dead-end job? Or, are you being left behind because you're not up on new industry methods? Don't let technical progress — automation — pass you up. There's an N.T.S. Project Method training program to help you MOVE UP FASTER and MAKE MORE MONEY!

N.T.S., a leading technical school for more than 60 years, **shop-tests every lesson and manual.** Easy-to-follow lessons are fully illustrated so you can learn **fast.** Look over the big opportunity home study courses below. Choose your field! Check the coupon and mail it today! You'll soon be on your way to a high-paying new career!

ELECTRONICS DIVISION

1. **Electronics-TV-Radio Servicing and Communications**
2. **Master Course in Electronics-TV-Radio Advanced TV and Industrial Electronics**
3. **FCC License Course**
4. **Radio Servicing (AM-FM-Transistors)**
5. **Television Servicing (Including Color)**
6. **Stereo, Hi-Fi and Sound Systems**
7. **Basic Electronics**
8. **Electronics Math**

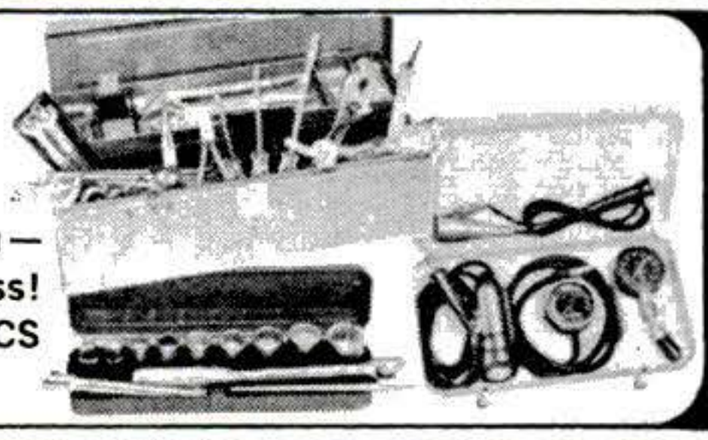
Train yourself quickly for America's "big future" industry! BIG EQUIPMENT KITS come with many of the electronics courses — at NO EXTRA COST! NO KIT DEPOSITS REQUIRED — equipment is included with your tuition.



AUTO-MECHANICS DIVISION

1. **Automotive-Diesel Master Course**
2. **Automotive Mechanics**
3. **Diesel Mechanics**
4. **Engine Tune-up and Electricity**

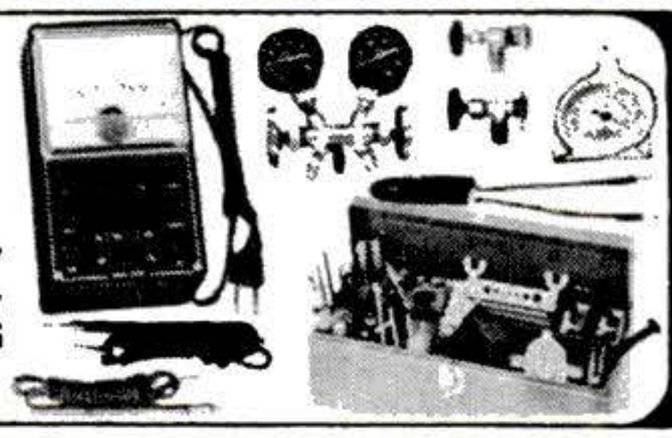
Eighty million cars and trucks need maintenance! Here's opportunity for you — in manufacturing, in sales and service — in your own auto repair business! VALUABLE TOOLS AND EQUIPMENT COME WITH ALL N.T.S. AUTO-MECHANICS COURSES! NO KIT DEPOSITS REQUIRED — NO EXTRA COST!



AIR CONDITIONING — REFRIGERATION DIVISION

1. **Air Conditioning-Refrigeration Servicing Course**
2. **Air Conditioning, Refrigeration & Electrical Appliances Master Course**

Good income in installation & servicing homes, factories, schools, hotels & motels, office buildings, stores, cars, trains, buses and in servicing electrical appliances. The trained man in these fields is in demand! BOTH COURSES COME WITH BIG EQUIPMENT KITS AT NO EXTRA CHARGE. NO KIT DEPOSITS REQUIRED.



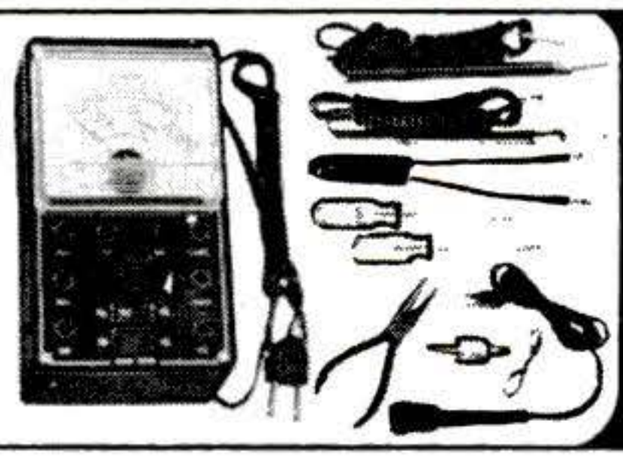
HIGH SCHOOL AT HOME

National offers accredited high school programs. Take only subjects you need. Study at your own pace. Everything included at one low tuition. Check special High School box in coupon for full information and FREE catalog.

HOME APPLIANCES DIVISION

1. **Home Appliances Master Technician's Course.** Prepares you quickly for a business of your own in all phases of major and small appliance work.
2. **Home Appliances Servicing Course.** Prepares you for a part or full time job. Earn while you learn.

No kit deposits required. No extra cost.



Classroom Training at Los Angeles.

You can take classroom training at Los Angeles in Sunny Southern California. N. T. S. is the oldest and largest school of its kind. Check Resident School box in coupon for details.

SEND FOR FREE BOOK & SAMPLE LESSON

CHECK ONE ONLY

NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

4000 S. Figueroa Street, Los Angeles, Calif. 90037

YOU ENROLL BY MAIL UNDER N.T.S. "NO OBLIGATION PLAN." WE HAVE NO SALESMEN; THIS MEANS LOWER TUITION FOR YOU.

Accredited Member National Home Study Council

NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

NATIONAL TECHNICAL SCHOOLS, DEPT. 202-26
4000 S. Figueroa St., Los Angeles, Calif. 90037

Please rush FREE BOOK AND SAMPLE LESSON on Courses in the Division checked below. No obligation — No salesman will call.

- ☐ ELECTRONICS Division
- ☐ AUTO-MECHANICS Division
- ☐ AIR CONDITIONING-REFRIGERATION Division
- ☐ HOME APPLIANCES Division
- ☐ HIGH SCHOOL Department

Name_____ Age____

Address _____

City_____ State_____ Zip_____

☐ Check here if interested ONLY in classroom training at Los Angeles.

Copyrighted material

If there are 10 businesses in your town, you can

MAKE UP TO $50 EXTRA A WEEK!

Line includes hundreds of items businesses need & use!

BY supplying just 10 business, political and professional men in your town with the office supplies, business forms and printed material they need — and use up — every day, you can make extra money every week in just a few hours of your spare time! National's great line of business necessities and advertising specialties makes it easy for you to earn $50, $100 a week—and more!

NO EXPERIENCE NEEDED YOU DON'T SPEND 1¢

We send you FREE everything you need to start making TOP COMMISSIONS right away. Send coupon below for FREE Kit that tells you how to start making extra money in spare hours you'll never miss. MAIL COUPON FOR FREE DETAILS. No obligation.

Home Office, National Press, Inc., Dept. 134, North Chicago, Ill. 60064

☐ Yes, I want your big line of BUSINESS PRINTING, BUSINESS NECESSITIES, and ADVERTISING SPECIALTIES FREE AND POSTPAID so I can earn extra money week after week in my spare time.

Name_____

Address_____

City_____ State_____ Zip_____

You can make money in

WATCH REPAIR

Learn at home the low cost Sweazey Way

Watch repairing pays up to $6 an hour, part time watch makers report on survey. Unique and modern Sweazey home study System starts you making repairs right away on Swiss and American watches. Professionally prepared training. No previous experience needed. Special tools provided for practice. Tuition only $5 a month. Diploma Awarded. Free sample lesson and opportunity book give all facts. Write today. No obligation.

CHICAGO SCHOOL OF WATCHMAKING

Dept. 426, Fox River Grove, Illinois, 60021

FREE BOOK and SAMPLE LESSON

CHICAGO SCHOOL OF WATCHMAKING
Dept. 426, Fox River Grove, Illinois 60021
Please rush FREE BOOK and Sample Home Study Lesson.

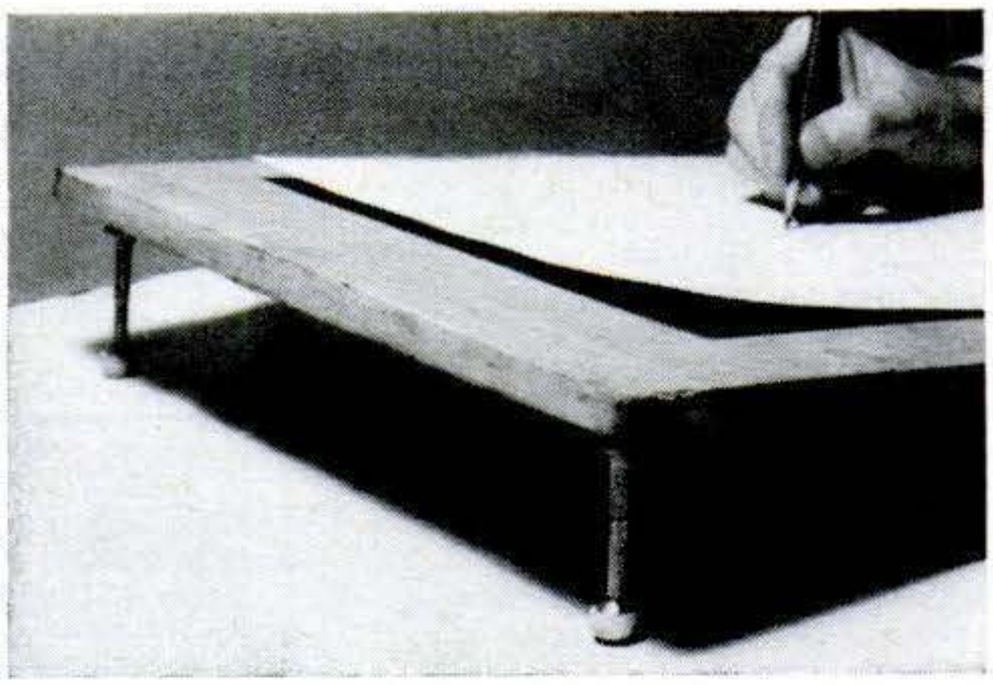
Name_____ Age_____

Address_____

City_____ State_____ Zip #_____

SHORT CUTS AND TIPS

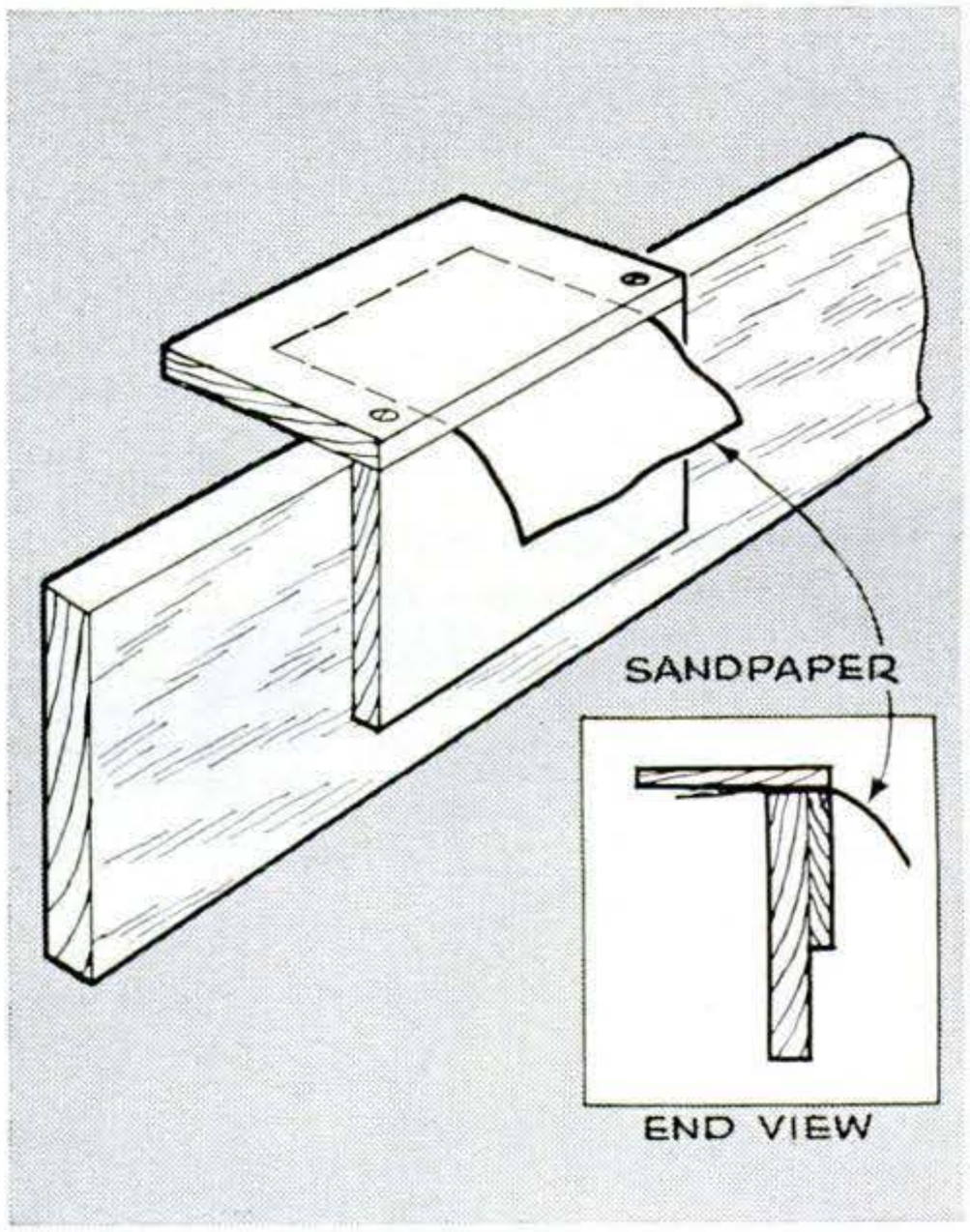
FROM PS READERS



Doorstops prop drawing board

A pair of baseboard doorstops screwed to the underside of a drawing board keep it tilted at an angle convenient for drafting. Also, the stops keep the board from sliding on the tabletop. For greater tilt, position the stops farther down the board.

WILLIAM SWALLOW, Brooklyn, N.Y.



Sanding jig preserves squareness

Sanding board edges absolutely square by hand is easy if you use this efficient sanding jig. It consists of two smooth boards screwed together at right angles. The right-angle joint serves as a clamp for your sandpaper. When the paper wears down, simply loosen the screws, feed in fresh paper, and tighten them again.

DANIEL BOUSHA, Jackson, Mich.

Copyrighted material

Stay with Your Job till Profits in Own Business Exceed Present Salary

We'll Finance You for all but moderate down payment

You gross $6 hourly profit on *each* serviceman plus $9 per hour on service you may render in spare time. Income is almost unlimited. The 24 page illustrated booklet we'll mail you (with no obligation) explains how easy, how simple this business is to run . . . how most of your gross profit becomes a *clear net profit* to you . . . how we guide you step by step to success.

Postage Stamp brings FREE book telling how.

If you've wanted to *be your own boss* . . . to be financially independent . . . have a growing business, now YOU CAN.

Many men have said to us, "I can't afford to give up my job till I know I have a sure thing . . . a sound business that will provide both *security* and a *better way of life*.

That made sense. So we built such a plan. Now hundreds of men have upped their scale of living with a Duraclean dealership. You don't experiment. You use tested, *proven* methods. You have our backing and know-how.

You keep your job while a customer list grows. When your business profits exceed your job salary, go full time lining up jobs for your servicemen.

Would you like this? Don't guess. Don't decide now. Mail the coupon so you'll have facts to decide wisely . . . and KNOW if this is what you want.

You operate from a shop, office or home. This business is easy to learn . . . easy to start . . . so easy to service that women dealers often do it.

We are *now* enlarging this worldwide system of individually-owned service businesses. If you are reliable, honest and willing to work, we invite you to mail the coupon. No obligation.

It's Easier than You Think to Start Your Own Business

In our illustrated booklet, you'll see the way we show you *step by step* how to quickly get customers . . . how recommendations multiply customers.

Your carpet and upholstery service not only cleans, it enlivens fibers . . . revives dull colors, raises pile. It eliminates soaking and fiber breaking from machine scrubbing. Mild aerated foam lightly applied lifts dirt, grease and unsightly spots. *Customers become your best salesmen.*

The booklet explains all 6 services which are rendered "on location." You have six ways for profit on every job.

National advertising explains your superior services, builds customer confidence . . . brings job leads to you.

We train and assist you. We show you 15 ways to get customers.

Don't delay! Get the facts TODAY before your location is taken.

Start Small, Grow Big . . . in this Booming Business

A third century ago Duraclean was an idea . . . but it caught fire and spread rapidly to a worldwide service. Why? Superior methods plus *tested, proven* ways to get customers. Our dealers, too, start small . . . and GROW.

A moderate down payment establishes *your own* business. We furnish electric equipment and materials to return your TOTAL investment. Men take partners.

If you have good habits and like to please customers, you will likely qualify for a Duraclean dealership.

It's been said, "Opportunity knocks but once at each man's door." This may be that *rare opportunity* in your life.

You can quickly decide from facts we'll mail you. So, find out now.

Your Services Are Endorsed by

McCall's Magazine, Parents; American Research & Testing Laboratories . . . and by leading Carpet Mills & Furniture Makers

What Dealers Say:

Langdon Lawson: National advertising is tops, creates leads. In September, working alone, jobs totaled $1,475.

R. C. Blue: Customer called a prominent competitor. They said they could not clean her badly soiled furniture . . . to contact me, "if anyone could get it clean, I could."

Charles Randal: Business keeps growing. Made as much as $120 in one day.

D. Kern: Duraclean's proven-best process and the continuous help from headquarters gave me a big jump on all competition.

George Byers: For University, my total billing was $2,416. Total expenses $814.

Gerald Weihrauch: Three persons called me . . . saw Duraclean advertised in magazines.

Edward Hoy: A smoke damage insurance claim bill was $186. All work was done by me in exactly 8 hours and 2 minutes.

John Hoak: I've never worked at anything I enjoyed more than Duraclean.

W. C. Smith: Earned $650 one week. Volume keeps getting bigger.

Service man for dealer **C. Weed:** Furniture was filthy black. When through, I was amazed how clean.

Loren Farris: I'm proud to be independent at 30. I wish I had known about Duraclean earlier.

Earl Davis: Our sales increased $17,660 this year.

Ed. Kramsky: In 2 years, I now have two assistants, a nice home and real security for my family.

Dealerships Resell at Big Profits

If, because of illness, moving, or for any reason a dealer wants to sell, we maintain a service to locate buyers and to help him sell.

Dealerships resell at up to 10 times the dealer's cost. R.D.K., after 5 months, sold for $2,000 above his cost. L.L., after 30 months, got $7,116 more than he had paid. The **value** of your dealership and franchise **grows monthly.**

FREE BOOKLET tells how to start Your Own Business

With no obligation, we'll mail you a letter and 24 page booklet explaining the business . . . how and why your income grows . . . how we help finance you.

Then decide if this opportunity fulfills your dream of independence and a much **bigger income.**

Your location could be taken tomorrow...so mail coupon **today.**

DURACLEAN COMPANY
6-182 Duraclean Bldg.,
Deerfield, Illinois 60015

Mail this coupon TODAY
It may put you in business

Duraclean Co. 6-182 Duraclean Bldg., Deerfield, Ill. 60015

With no obligation mail letter with 24 page illustrated booklet explaining how I can increase my income and **family security with a** Duraclean Dealership.

Name_____

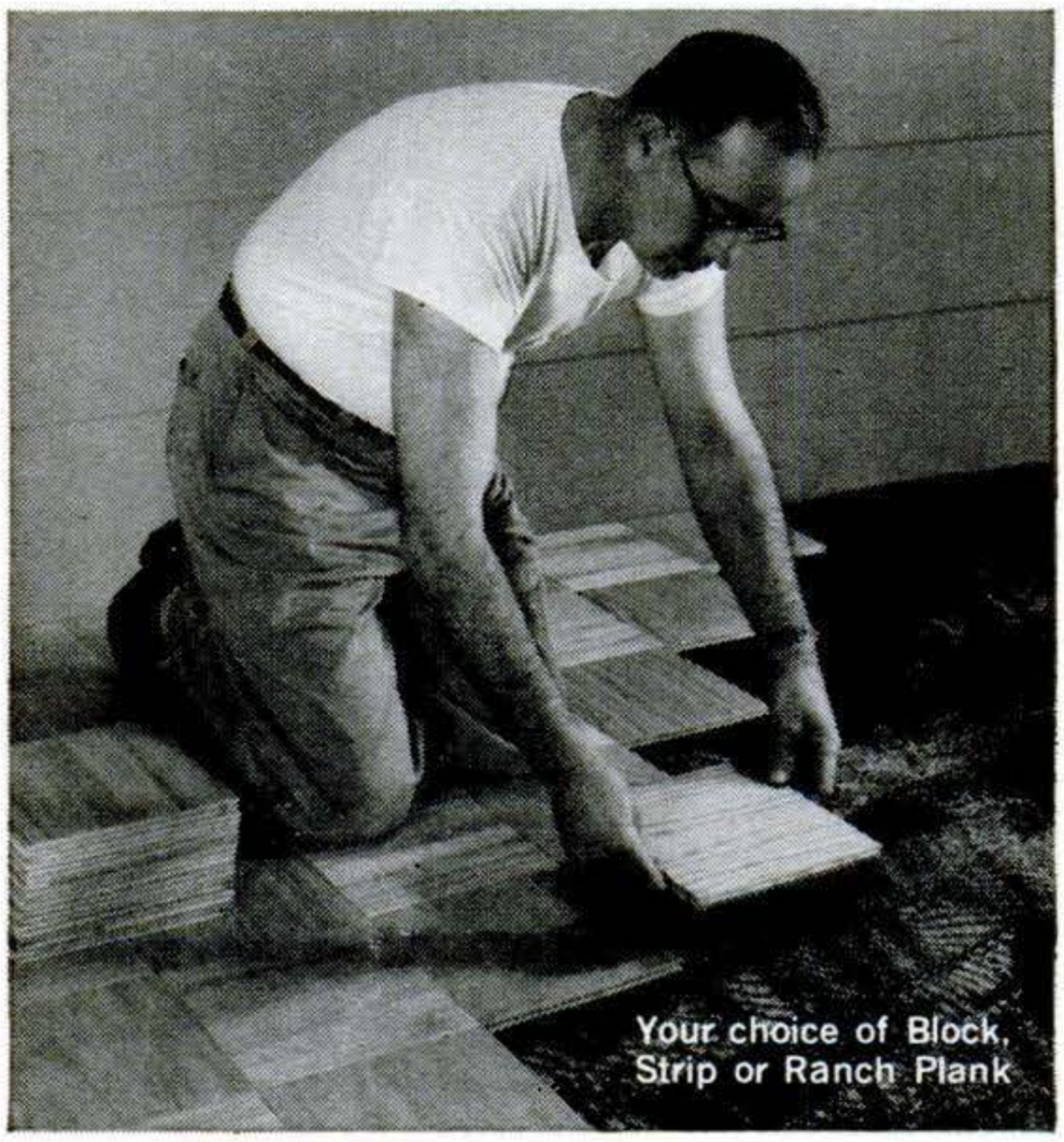
Address_____

City_____ State_____ Zip_____

Find Out with No Obligation

Copyrighted material

Now! It's easy to have Bruce Oak Floors



PREFINISHED... just lay over subfloor or old floor

Now you can give your living room, bedrooms or added-on room the lasting beauty and style of famous Bruce Floors. This highest quality Oak flooring, completely finished at the factory, can be laid over new subfloor or old floor. Bruce Blocks are installed in adhesive (see above). Ranch Plank with pegs and Strip floors are blind nailed. No sanding or finishing.

ECONOMICAL! A new Bruce Oak Floor will cost you less than a good rug . . . and will last the life of your home. The beautiful Bruce Prefinish doesn't chip or mar, and is so easy to care for. Mail coupon below for booklet in color.

MAIL FOR FREE FLOOR BOOKLET

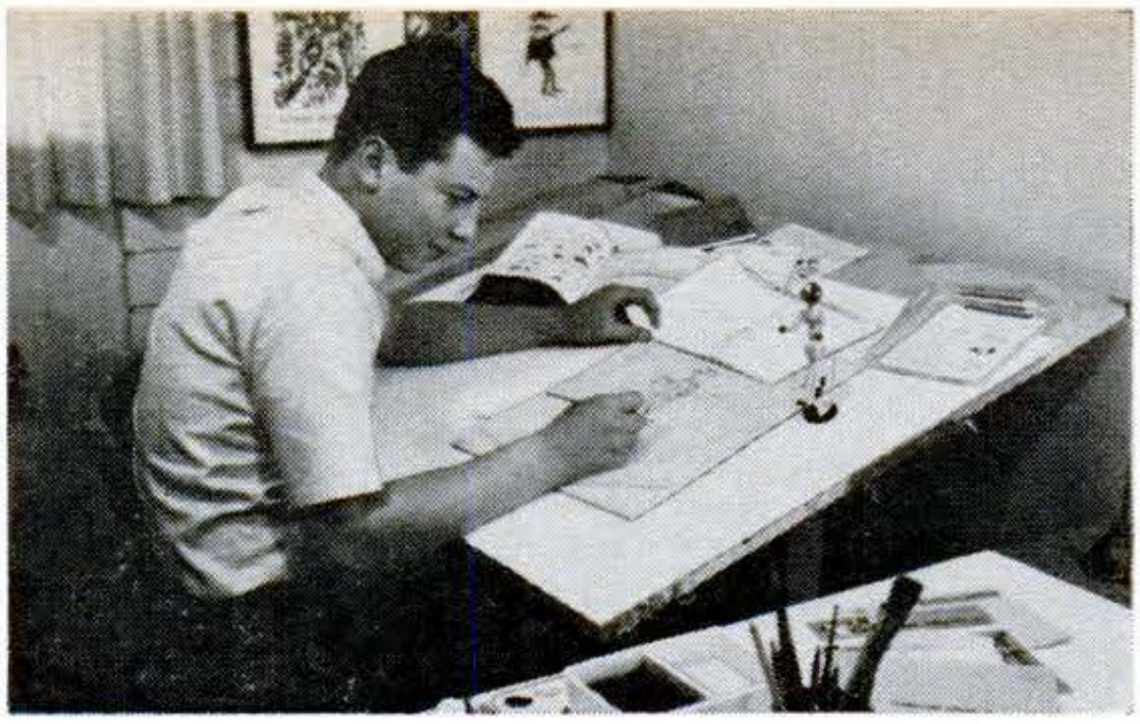
E. L. Bruce Co.
1524 Thomas Street
Memphis, Tenn.—38101

Send information on Bruce Prefinished Oak Floors to:

Name_____

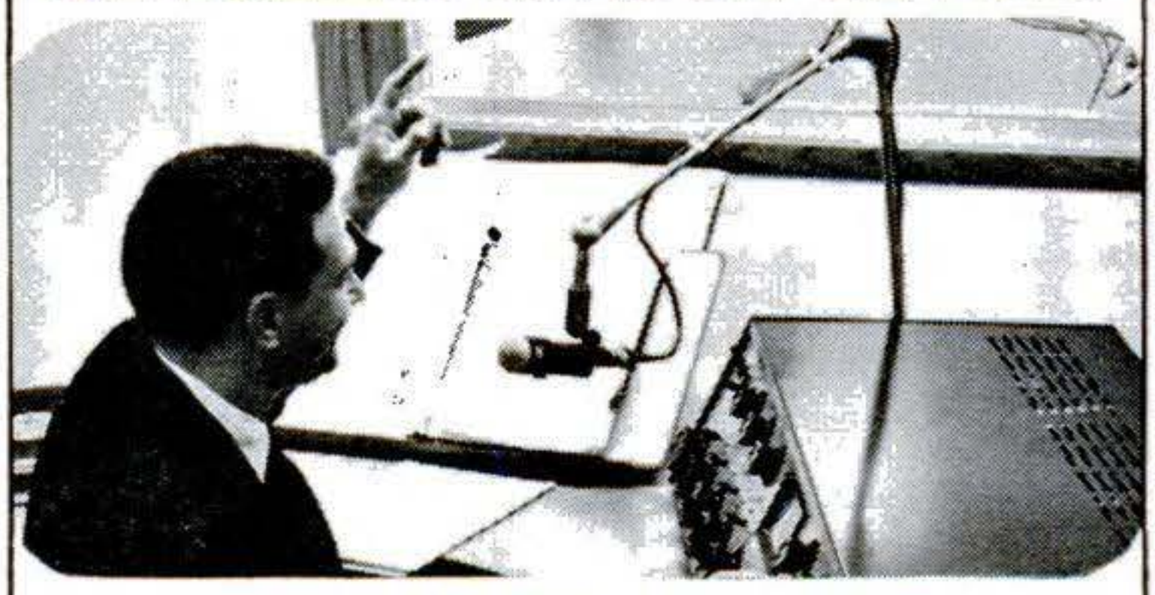
Address_____

BRUCE Prefinished Oak Floors



LEARN CARTOONING AND COMMERCIAL ART. In weeks you'll be able to draw. We teach you how with easy-to-learn at home course. Turn your creative talent into a well paying commercial art career—we show you how! No previous training or art ability needed. Wide demand for full or part time commercial artists, cartoonists, etc. Gain professional prestige, turn your spare time to profit. Low monthly tuition. Write for Free Informative Booklet. No Salesman will call. **Continental Schools, Dept. 6A-3; 1330 W. Olympic Blvd., Los Angeles, Calif. 90015.**

You can train to be an announcer or D.J.



FREE VOICE ANALYSIS

Exciting new way to find out if you have the hidden talent to train for a career in radio and TV broadcasting. Urgent demand for qualified graduates. Unique, nationally recognized course supervised by John Cameron Swayze, Fran Allison, and five other broadcasting "greats" opens new horizons of high pay and fame in your life. Train in our fully equipped studios or at home in your spare time. Career Academy "reinforced learning" technique based on principles developed at Harvard and Columbia speeds training. Mail coupon today. No obligation. Training studios located in major cities.

CAREER ACADEMY

825 North Jefferson Street, Milwaukee, Wis. 53202

Please rush free, colorful 32-page brochure and arrange for Voice Analysis in my community.

Name_____ Age_____

Address_____

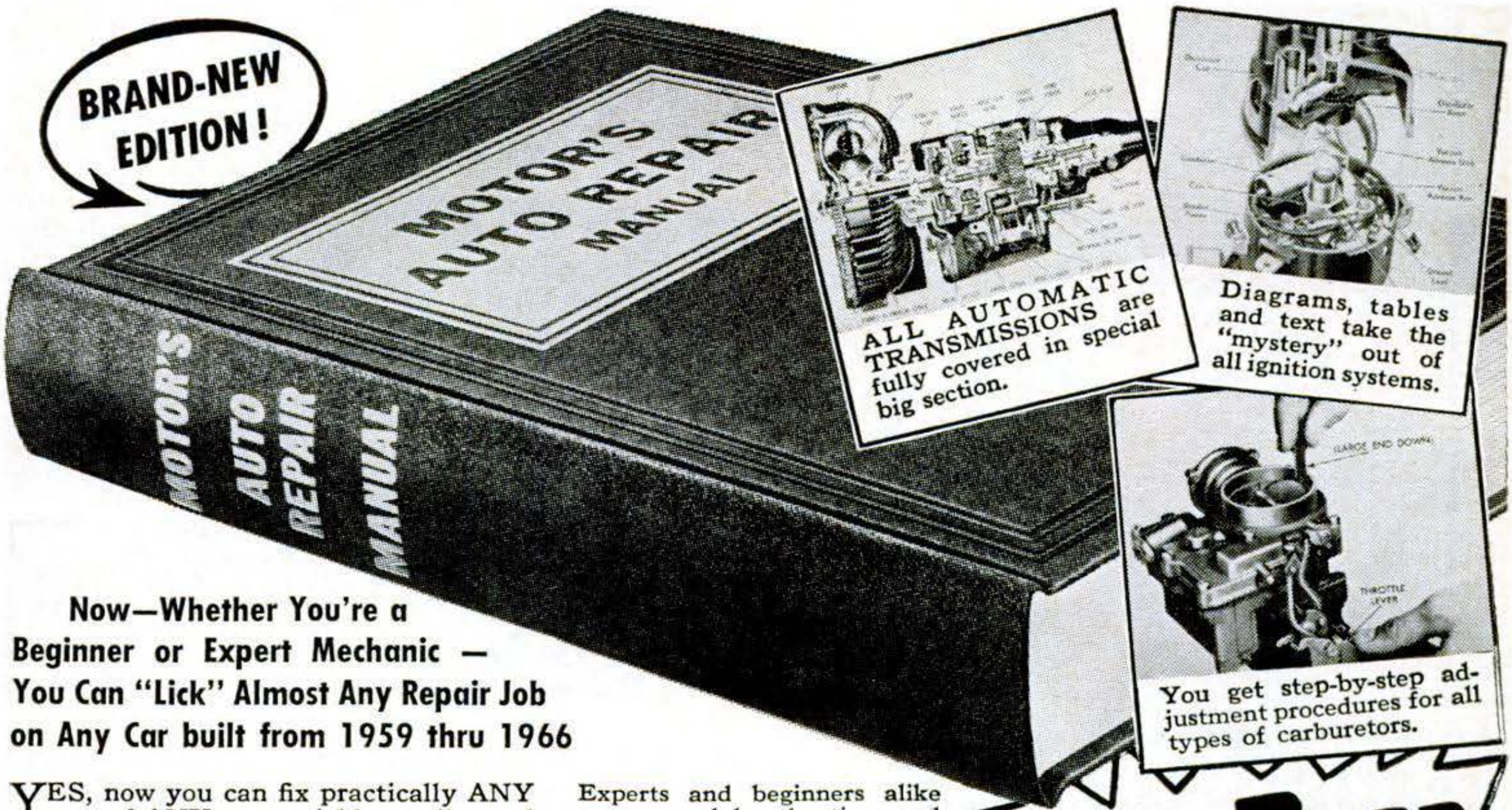
City_____ N25:N266 State_____

Copyrighted material

Here's the EASY, Step-by-Step Way to

FIX ANY PART OF ANY CAR

Engines, Brakes, Transmissions, Rear Ends, Generators—Yes, *All* These Parts



Now—Whether You're a Beginner or Expert Mechanic — You Can "Lick" Almost Any Repair Job on Any Car built from 1959 thru 1966

YES, now you can fix practically ANY part of ANY car—quickly, easily, and right! From carburetor adjustment to a complete overhaul, it's easy when you have MOTOR's famous Auto Repair Manual. It's like having a staff of factory experts and MOTOR's field-trained engineers beside you, guiding you every step of the way. No wonder so many thousands of beginners and experts alike use this step-by-step, illustrated manual.

MOTOR's Manual "starts from scratch"—leads you through entire job with easy step-by-step directions, clear "how-to" pictures. Tells you WHERE to start, what TOOLS to use. You just CAN'T go wrong!

OVER 5 MILLION COPIES SOLD!

3,800 Pictures! So Complete So Simple, You CAN'T Go Wrong!

NEW, REVISED edition covers all you need to know to repair almost any car, 1959-1966, *including all the new models!* 1,350 Giant pages. 3,800 "This-Is-How" pictures lead you every step of the way. 457 "Quick-Check" charts — 55,000 essential repair specifications. Over 225,000 service and repair facts. Instructions and pictures so clear you can't go wrong!

Experts and beginners alike are amazed by the time and labor-saving methods!

The "Meat" of 300 Official Shop Manuals

The editors have put together the "know-how" from 300 Official Shop Manuals and "boiled it down" into one fully-illustrated easy-to-understand guide.

Here's ILLUSTRATED step-by-step guidance on Automatic Transmissions, Generators, Ignition, Carburetors, Fuel Pumps, Steering Gears, Rear End, Brakes, PLUS MUCH MORE.

Try Book for 10 Days FREE

SEND NO MONEY

Try Book for 10 Days FREE

Just mail coupon. (Attach it to postcard if you wish.) Test book in your garage or shop. *GUARANTEED* to pay for itself in 10 days or you owe nothing. *MOTOR Book Dept., 250 West 55th St., New York, New York*

Expert Raves About Book . . .
"Motor Manual is worth its weight in gold. I've done mechanic work for over 25 years. Motor has saved me many hours of brain-racking thinking."
—R. Carter, N. Carolina (Mechanic)

. . . So Does Beginner
"In technical high school where I learned the auto mechanic's trade, Motor's Manual pulled me out of some rough spots. Now I'm in the Armed Forces, attached to motor pool."
—W. Bekemerer, Missouri (Apprentice)

Same Offer on MOTOR'S New TRUCK REPAIR MANUAL

Covers all gasoline engines, plus Ford, GM, Cummins, Mack, Perkins, International diesels since 1955. Over 2,000 pictures! Check coupon for FREE TRIAL.

Brand-New—Covers All These Makes

American	Fury	Mercury
Barracuda	Corvette	Meteor
Bronco	Dart	Mustang
Buick	De Soto	Oldsmobile
Buick Special	Dodge	Olds F-85
Cadillac	Edsel	Plymouth
Chevelle	Fairlane	Pontiac
Chevrolet	Falcon	Rambler
Chevy II	Ford	Studebaker
Chrysler	Imperial	Tempest
Comet	Jeep	Thunderbird
Continental	Lancer	Valiant
Corvair	Lincoln	Volkswagen
	Toronado	Marlin

MAIL COUPON NOW FOR 10-DAY FREE TRIAL

MOTOR BOOK DEPT., Desk 622
250 W. 55th St., New York, N. Y. 10019

☐ Rush to me at once **MOTOR'S New AUTO REPAIR MANUAL.** If O.K., I will remit $2 in 10 days, $3 monthly for 2 months and a final payment of $1.95 (plus delivery charges and sales tax, if any) one month after that. Otherwise I will return the book postpaid in 10 days.

Print Name.....Age.....

Address.....

City.....

State.....Zip Code.....

☐ Also send me for 10 days' Free Trial **MOTOR'S New TRUCK REPAIR MANUAL.** If O.K., I will remit $11, plus delivery charge and sales tax, if any, in 10 days. Otherwise I will return book postpaid in 10 days.

☐ **Check box and save** shipping charge by enclosing WITH coupon in envelope entire payment of $9.95 for Auto Repair Manual (or $11 for Truck Repair Manual) plus sales tax, if any. Same 10-day return-for-refund privilege applies.

Copyrighted material

MAKE MORE MONEY AT HOME IN YOUR OWN BUSINESS

in spare time

LEARN UPHOLSTERY

We are proud of our Membership in the Association of Home Study Schools. We subscribe wholeheartedly to its Code of Ethics, formulated for the purpose of encouraging the highest possible standards of education through Home Study.

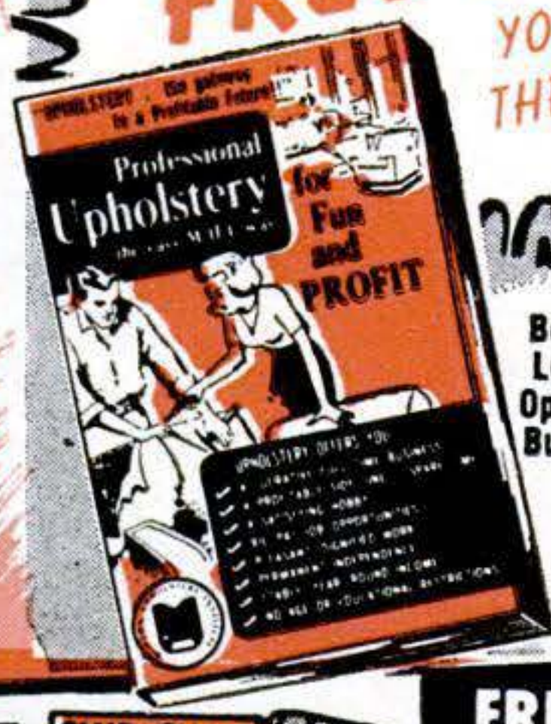
ASSOCIATION OF HOME STUDY SCHOOLS

EARN AS YOU LEARN RIGHT FROM THE START—Make beautiful Custom Furniture. Turn *old* furniture into new for *BIG* PROFITS. Reupholster chairs, divans, footstools. Repair furniture of all types. Make Slip Covers, Drapes, Cushions. Your home is your workshop. No overhead and no expensive equipment.

SKILLED UPHOLSTERERS URGENTLY NEEDED NOW! Shops desperate for help! Can't satisfy Upholstery demand created by population explosion, gigantic new home, apartment, hotel, motel, office, restaurant construction. Upholsterers earn TOP MONEY, are needed *Everywhere!*

WE WILL GIVE YOU EVERYTHING: 1) Most Modern, Complete Course ever offered. 2) Complete Set of Tools. 3) Practical "Learn-by-Doing" Projects, 4) Professional guidance every step of the way.

GET THIS **FREE BOOK** YOURS FOR THE ASKING!



Air Mail Coupon for FREE Illustrated Book, Useful Sample Lesson and Plan for Operating a Profitable Business at Home . . .

All 3 are Yours **FREE!**

MODERN UPHOLSTERY INSTITUTE
Box 899-VN, Orange, Calif.
Please send FREE Illustrated Book and SAMPLE LESSON. No obligation — No salesman will call.

Name_____ Age_____
Address_____
City_____ Zone____ State_____

BE YOUR OWN BOSS—Start small, at home . . . Enjoy a good income for life! • Send for your FREE ILLUSTRATED BOOK and SAMPLE LESSON . . . TODAY!

FREE materials, fabrics, tools, supplies to make a ROOM-FULL of beautiful furniture like this . . . *YOURS to KEEP or SELL!*

MODERN UPHOLSTERY INSTITUTE, Box 899-VN, Orange, Calif.

---

53 ORIENTALS - ONLY 10¢

Imported from strange lands of the mysterious Far East—this valuable collection of 53 genuine postage stamps from Borneo, Burma, Hong Kong, Malaysia, Nepal, Siam, Sarawak, Singapore, Viet Nam, etc. Supernatural Demon-God (half man, half bird), ferocious wild beasts, ceremonial dancers, weird oriental idols, many others. Guaranteed worth over $1.50 at standard catalog prices—**all for 10¢!** Also, other fine stamps from our approval service returnable without obligation—plus **FREE** Illustrated Catalog. Send today!

Jamestown Stamp Co. Dept. C26PS Jamestown, N.Y. 14701

Jamestown Stamp Co. Dept. C26PS Jamestown, N.Y. 14701
RUSH my Collection of 53 Orientals & other offers. I enclose only 10¢ for mailing expenses.

Name .....
Address .....
City, State & Zip Code .....

Not To Be Confused With Imitation Plastic Models Selling For Less

Sale Price **$5.95** Not sold to Calif. or N.Y. res.

22 Cal. Blank Cart. 8 Shot Revolver
No Permit Required
Imported from ITALY

"BLACK VENDETTA"

Latest model, not a toy. Gun is of solid steel construction. Lightweight and perfectly balanced. Fires 8 rounds in 2 seconds! Double or single action. Precision crafted, 5½ inches long. Ideal for stage, sporting events, boating, protection. Revolver $5.95, deluxe leather holster $2.25. Send cash, check or M.O. and save C.O.D. charges. $1.00 deposit with C.O.D. orders.

BIG THREE ENT. INC. 1109 Sixth Ave., New York 10036, N. Y. Dept. PS266

EARN UP TO $50 A WEEK IN YOUR SPARE TIME AS A

TYPEWRITER REPAIRMAN

Great demand for trained men. Over 25 million typewriters need service and repairs! Cash in on this 300 million dollar market. Now you can get industry-approved training at home. Easy to learn. Low Cost. Qualify quickly in your spare time for a high paying job or a business of your own. Earn while you learn. Real typewriters, sub-assemblies, visual aids, and professional tools provided at no extra cost. Simple, clear illustrated lessons. Expert teachers personally guide you all the way. Fully licensed, accredited, and approved school. State authorized diploma. **Mail Coupon Today.** Typewriter Repair School, Little Falls, N.J. 07424

TYPEWRITER REPAIR SCHOOL
DEPT. 311-026,
Little Falls, New Jersey 07424

FREE BOOK ☐

Send FREE BOOKLET describing unlimited opportunities for Typewriter Repairmen. No obligation. No salesman will call.

Name.....
Address.....
City.....State.....Zip.....

Copyrighted material

New Free Book Discusses

How to Go About Selling Your Invention

If you have an invention or an idea for an invention, whether patented or unpatented, that you wish to sell outright or on a royalty basis, the booklet we offer free in the coupon below may be very valuable in saving you both time and money.

We are specialists in representing inventors and submitting their inventions and ideas to manufacturers. We work continuously with scores of manufacturers seeking new products, and we have connections from coast to coast and in foreign countries. We are well informed which manufacturers may be especially interested in your particular kind of invention. Hundreds of these manufacturers have written us descriptions of the types of inventions they want.

Our service is designed to do all the many things the average inventor does not have the time or facilities for doing, or who lacks knowledge of the proper markets. When you appoint us to represent you, we prepare sales material that points up your invention, its advantages, its construction, its market potential and profit possibilities.

For presenting your invention to selected manufacturers we charge a modest fee (which is refunded if we handle the sale of the invention for you) and the customary commission. We are a Nationally known concern, with an impeccable reputation for ethics and integrity. We believe ours is the finest service offered inventors.

We are not patent attorneys. However, if you have need for a patent attorney and do not know one, write us and we will tell you how to obtain the names of all U. S. Patent Attorneys in your area, and you can make your own choice.

To encourage inventors, whether their inventions are patented or unpatented we have prepared a booklet entitled "How to Go About Selling Your Invention." This booklet contains such information as current royalty rates being paid by manufacturers, discusses various types of inventions and the markets for them, and tells the most effective methods you can use in presenting your invention for sale, whether you employ us or do it yourself.

You can obtain a copy of this booklet merely by mailing the coupon below. It will be sent to you with our compliments, free, without any obligation whatever. If you wish to write us for comments about your invention, please do so. We make no charge for consultation. But please do NOT send blueprints or models. Just describe your invention briefly, its nature and purpose.

REFERENCES: Your own bank, attorney, or Chamber of Commerce.

K. O. Kessler, *President*
KESSLER SALES CORPORATION
Accredited as a Corporation
Under the Laws of Ohio
FREMONT, OHIO

MAIL THIS COUPON FOR FREE BOOKLET

Mr. K. O. Kessler, *President*
Kessler Sales Corporation, Dept. D-72, Fremont, Ohio

Please mail me a copy of your FREE Booklet, "How to Go About Selling Your Invention," which reveals many points about selling inventions and explains your service. It is understood that there is no charge for this booklet now or at any other time and I am not obligated in any way.

MY NAME .....

STREET ADDRESS .....

CITY ..... STATE ..... ZIP CODE .....

Copyrighted material

Draw Lincoln

AWARDED MONTHLY: $595.00 Scholarship in Commercial Art

Draw Lincoln in pencil—but make your drawing a different size from the picture at the right.

If you win the scholarship prize, you get the complete course in commercial art taught by America's largest home study art school—Art Instruction Schools. You will receive personal attention from professional commercial artists in the fields of advertising art, illustrating, cartooning and painting.

Even if you do not win, you will get a professional estimate of your talent without cost.

Entries for March contest must be in before March 31, 1966. None can be returned. Our students and professional artists are not eligible. Clip the coupon below and mail it right away!

ART INSTRUCTION SCHOOLS
Studio 2146 • 500 South 4th St., Minneapolis, Minn. 55415
Please enter my drawing in your draw-a-head contest.
(PLEASE PRINT)

Name_____
Occupation_____ Age____
Address_____ Apt.____
City_____ State_____
County_____ Zip Code_____

Accredited by the Accrediting Commission of the National Home Study Council.

FIND TRULY CAREFREE DRIVING

HULL

THE PIONEER COMPASS FOR CARS AND BOATS

At your dealer's or write for literature
HULL MFG. CO., Box 246-E-2, Warren, Ohio

Learn how to become a
GAME WARDEN
GOV'T HUNTER, FORESTER, WILDLIFE MANAGER

Exciting job openings now for qualified men who love outdoor work. *Protect forests and wildlife—arrest violators!* Good pay, security, prestige and authority for respected career Conservation Officers. *Easy home-study plan!* Send for FREE Fact BOOK, aptitude QUIZ, SUBSCRIPTION to Conservation magazine. State age.

NORTH AMERICAN SCHOOL OF CONSERVATION
Campus Drive, Dept. 182, Newport, Calif. 92660

U.S. STAMPS
Plus NEW COMPLETE U.S. CATALOG!

4 SENSATIONAL OFFERS IN ONE—ONLY 10¢!
To Introduce You to the World's Largest Stamp Firm and America's Favorite Hobby:
1. Genuine centennial postage stamp, as illustrated, picturing first U.S.A. (issued in 1847!).
2. Big collection of 25 all-different United States—Ancient 19th century, $1.00 stamp, etc.
3. Collection prized Commemoratives: 1775 Revolution, Wild West, 1893 Columbian, many others.
4. Collectors Guide; Bargain Lists; fine stamps from our approval service returnable without obligation; NEW Complete U.S. Catalog.

Send only 10¢—TODAY!

H. E. HARRIS, Dept. C-6, Boston, Mass. 02117

Please Mention Popular Science When Writing to Advertisers

Shrinks Hemorrhoids New Way Without Surgery Stops Itch – Relieves Pain

For the first time science has found a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain – without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all – results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne®)—discovery of a world-famous research institute.

This substance is now available in *suppository* or *ointment form* under the name *Preparation H®*. Ask for it at all drug counters.

Copyrighted material

Used by Canada's Finest in SUB-ZERO Weather to Instantly Warm Tents, Cabins, Trucks, Boats—Cooks Complete Meals—Gives Safe FLAMELESS Heat Anywhere.

Catalytic HEATER-STOVE COMBO

NO DANGEROUS OPEN FLAMES. INSTANT AND ADJUSTABLE FLAMELESS HEAT WHENEVER YOU WANT IT

Canadian know-how engineered, this new, improved, FLAMELESS Heater-Stove. It's a Catalytic heater with no dangerous open flame. Guaranteed 100% safe for a lifetime. Even if it topples it can't ignite or explode. Yet it gives you more constant comfortable vented heat than any heater in the world. Starts with the catalytic activity of precious platinum within the cylindrical steel body. Uses white gasoline, lighting naphtha, or pure benzine naphtha. Over 60,000 heaters sold last year. Tested and proven. Used by trappers and in the Yukons. Ideal for Camping, Cars, Cottages, Hunting, Blinds, Fishing, Boating, Garages, Home. Performs successfully even in Sub-Zero Arctic areas.

$22.95

plus $1.50 ppd. and hdlg.

FEATURES All Steel Cylindrical Body—Lasts a Lifetime—Carry It Even While In Operation—No Fear of Spilling or Going Out—Weight 3½ lbs.—Odorless—Heats up To 24 Hours on 2 pints of fuel—Use Anywhere—100% Waterproof, windproof.
FLAMELESS—No Fumes—Non Toxic—Economical—Holds 2 quarts of fuel. Explosion & fire-proof. Delivers up to 5,000 BTU's per Hour.

STANDARD AMERICAN HEATER Dept. 2-PS
1 Park Avenue, New York, New York 10016

***WARNING*—**
Do not confuse this catalytic Heater-Stove with cheap open-flame heaters that consume large amounts of oxygen, produce dangerous carbon monoxide, and create fire hazards. Order today. Money back guarantee.

Genuine Leather

U. S. NAVY FLIGHT JACKETS

Gov't Acquisition Cost $50.40

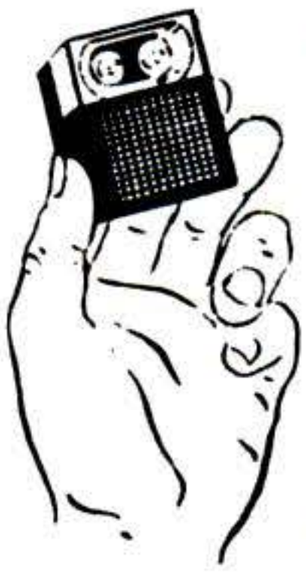
Only Known Lot in Existence

Soft Mouton Collar. Finest Goatskin Leather. Wool knit cuffs and bottom. Sizes S-(36) M-(38) L-(40-42). (Used. Good condition)

Our Price
$22.95
plus $1.00 hdlg.

STANDARD AMERICAN JACKET Dept. 2-PS
1 Park Avenue, New York, N.Y. 10016

ASTRONAUT'S *Rechargeable* SUPER POWER FLASHLIGHT



- **Twin Beams Disperse Light in 4 Directions**
- **Weighs 2 oz.**
- **10 Times Stronger than bulky 2-cell lights**
- **Stores Light Indefinitely**

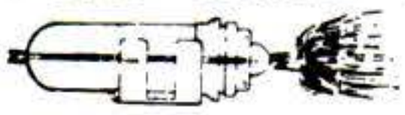
World's tiniest, most powerful flashlight. Designed for use in space capsule now available to public. Permanent battery stores light indefinitely—. Easily fits in palm of your hand, can be fastened to hat, worn on wrist, carried in pocket. Gives 6 hours of constant light power. Battery can be quickly recharged from any house current. (No need to buy batteries). Flashlight and recharger unit

***Only* $6.95**

Check or money order. Money back guarantee.

STANDARD AMERICAN LIGHT Dept. 2-PS
1 Park Avenue, New York, New York 10016

HELL-CAT TAKES OFF



America's Lowest Priced Jet Engine

Takes off all by itself or powers model autos, plane, boat, train, etc. Strong constant thrust for exciting experiments. Operates on ram jet principle. Fast Starting. No Moving Parts. Operates on Solid Fuel.
Only **$1.50.** +50¢ for Fuel.

60,000 CANDLE POWER
Long Distance Land & Sea

POWER BEAM

100% waterproof
Made for skin divers to withstand underwater pressures. Illuminates objects up to ½ mile distances. Powerful beam can be seen for 12 miles. Cuts through fog & smoke. Stands sturdy on end. Floats. Dentproof. Can't rust or corrode. EXTRA BONUS—4-way switch can be positioned for "ON" & "OFF" flash. Signal many miles in case of distress. Used by skin divers, boatmen, hunters, fishermen, shippers, watchmen, firemen & police. **$4.95** cash, check or M.O.

$4.95
Post Paid

AUTOMATIC 60-SHOT PELLET STINGER

$1.98

Dogs, Other Animals, Assailants Instantly Repulsed. The pellet is harmless but STINGS. Holds and fires 60 pellets automatically as fast as you can pull the trigger to knock most stubborn assailants off guard. Portable. Fits easily in pocket or purse. Made of high impact styrene for long life, trouble-free use. Fully guaranteed. Keeps dogs and animal pests off your property. A great training aid. More humane to animals than kicking or hitting. Send **$1.98** cash, check or money order plus 27¢ to cover handling and we include 50 stinging pellets. Not sold in N.Y.C. or if under 16 (State age with order). **(100 pellets $1) (250 pellets $2) (1000 pellets $5).**

---

10 FT. HOT AIR BALLOON

TEN FEET TALL

Rises to amazing heights on just hot air. Safe as no flames are carried aloft. Use it over & over. Ideal for celebrations, science clubs, advertising. Will carry parachutes, instruments and small animals for space tests aloft. Multi-colored, precut gores. Complete kit & instructions for inflating, launching. Only $2.98 postpaid or 2 for $5.50. Send cash, check or money order to—

Standard American Suppliers,
Dept. 2-PSAB
1 Park Avenue
New York, N.Y. 10016

SEE WITH NEW MIRACLE X-RAY SPECS

3 Dimension X Ray illusion Instantly

Hilarious Fun! Just slip on your X Ray Specs —"See" through skin —fingers—see bones underneath. Look at people—is it actually their body you see under clothes? Great fun at parties. They give you a 3 dimensional X Ray illusion instantly. No batteries. No electricity. Fully guaranteed.

Send only $1.00 plus 25¢ postage.

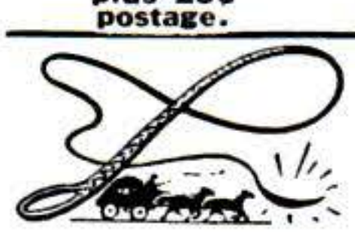
MUSTANG HORN

GIVES YOUR CAR A WILD-HORSE WHINNY

Makes your car whinny like a rip-snorting stallion.

ONLY **13.95**

Distinctive Mustang Horn attaches easily under hood to all cars, all models, makes your car whinny like real wild stallion. Complete with horn button, wire, easily installed without special tools. 5"x5½"x6". Specify 6 or 12 volt. 13.95 plus 75¢ pp hdlg. Satisfaction Guaranteed or your money back immediately.



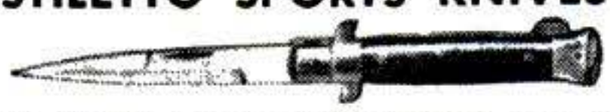
Genuine Leather

BULL WHIPS

Loud Noise! Cracks like a rifle!

Experts knock people off their feet, put out cigarettes, knock ashes off cigars. Coil it or crack it! Used by cowboys, trainers, ranchers. Loud rifle type blast. Woven 4 ply genuine leather. 6 feet long **$1.98,** 2 for **$3.50.** Send check or money order on 10 day Free Trial.

STILETTO SPORTS KNIVES



OPENS WITH FLICK OF FINGER, and locks with a click into position. Blade can't shut when in use. PUSH BUTTON release. Handy pocket size, yet rugged. Fine quality, polished stainless steel razor-sharp blade. PIERCES METAL. Narrow tapered stiletto blade with thick rigid backbone for heavy duty trouble-free use. Fine outdoor knife for sportsmen and emergencies. Comfortable handle. Safety guards. Order now. Don't be fooled by im...

$1.88
Free Postage

Metal Piercing Throwing Knife

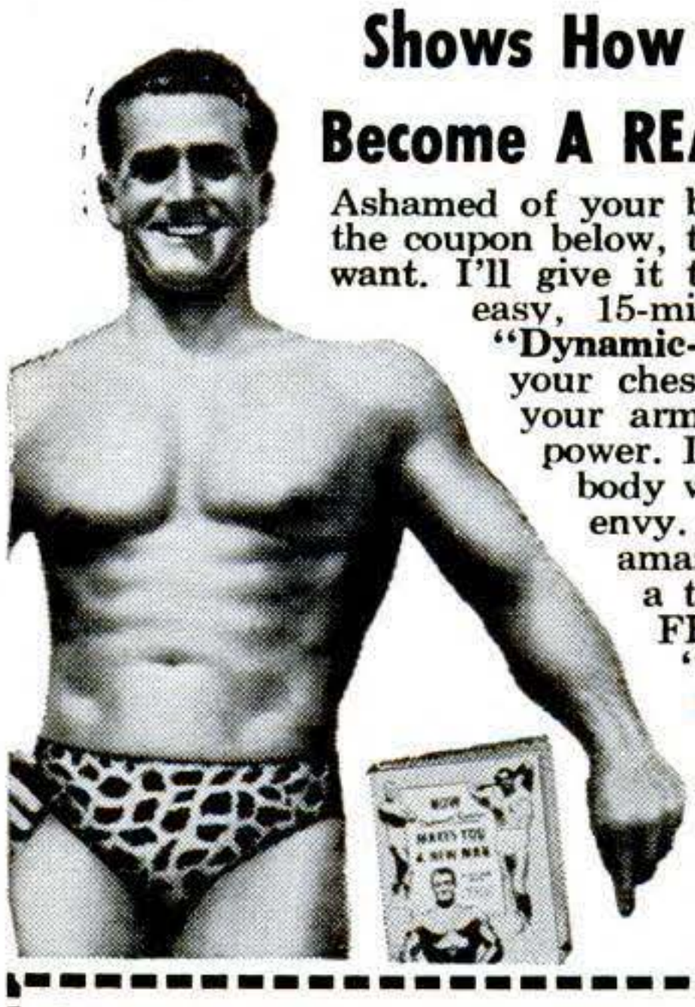
Great for hunting game. Weighted, balanced for sure throwing accuracy. Hits with a hard smack. FAST, EASY TO THROW. Use for self defense, hunting, thrills, targets. Razor sharp cutlery steel. 16" long—Double edge. Wrapped leather handle. **$1.00** (2 for **$1.85**) (3 for **$2.75**). Knife-throwing instructions FREE. Order Now.

STANDARD AMERICAN Dept. 2-PS, 1 Park Avenue, New York, N.Y. 10016

Copyrighted material

CHARLES ATLAS Says: **MY FREE BODY-BUILDING BOOK**

Shows How YOU Can Become A REAL HE-MAN



Ashamed of your body? Then tell me, in the coupon below, the kind of body you *do* want. I'll give it to you FAST—with my easy, 15-minutes-a-day method of **"Dynamic-Tension."** I'll make your chest and shoulders bulge, your arms and legs surge with power. I'll give you the kind of body women admire and men envy. *Your friends* will be amazed. *You* will feel like a tiger!

FREE BOOK. Learn how **"Dynamic - Tension"** made me "World's Most Perfectly Developed Man"—and how I can change YOU. Mail coupon to me: CHARLES ATLAS, Dept. 1B, 115 E. 23rd St., N. Y. 10010.

CHARLES ATLAS, Dept. 1B
123 East 23rd St., New York, N. Y. 10010

Dear Charles Atlas, Here's the Kind of Body I Want: (Check as many as you like)

☐ Broader Chest, Shoulders ☐ Powerful Arms, Legs
☐ Iron-Hard Biceps, Grip ☐ More Solid Weight

Show me how **"Dynamic-Tension"** can make me a new man. Send your famous 32-page FREE book, full of pictures, valuable advice. No obligation.

PRINT NAME.....AGE.....

ADDRESS.....

CITY & STATE.....ZIP CODE.....

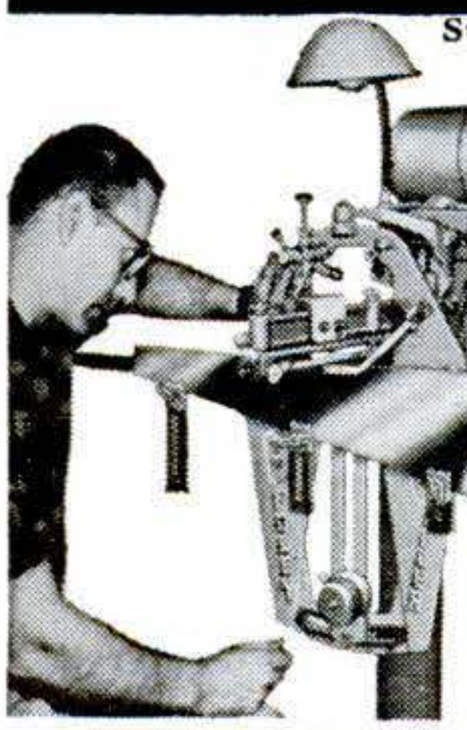
In England: Atlas, Chitty St., London, W.1

FREE PLAN

Be Your Own Boss

New Business Opportunity

FILING SAWS



Start a steady repeat CASH business in your basement or garage. Earn $3 to $6 an hour in your sparetime! Excellent profits in saw sharpening business! Automatic Foley Saw Filer, easy to operate, files combination saws, hand, band, and circular saws. No experience needed. H. C. Delbert wrote us: "Since I got my Foley Filer 5 years ago, I have averaged 4½ saws each day since I started."

Every saw you sharpen brings you more customers. "I rented a two-car garage and have all the work I can do," writes Charles H. Smith.

FREE BOOK
Shows How to Start

Fact filled booklet tells you how to start a sparetime business immediately; how to get new business, how to advertise. Rush coupon now; get "Money Making Facts" and details on Easy Payment Plan. No Salesman will call.

Send Coupon for FREE BOOK Money Making Facts

FOLEY MANUFACTURING CO.
219-6 Foley Bldg. Minneapolis 18, Minn.

Send FREE BOOK—"Money Making Facts", and Time Payment Plan.

Name_____

Address_____

New Table Top Invention Puts You In...

PROFITABLE RUBBER STAMP BUSINESS

Home Operators now make $16.50 AN HOUR in Business once monopolized by a few big companies

Special rubber stamps bring high prices—cost only pennies to make on new, low-cost table top machine. Take 27 cents worth of material, make perfect stamps, the kind businesses and offices now buy by the dozen at $2.75 each. Make up to $16.50 an hour. Start in spare time in your own home. Run machine on kitchen table using ordinary electrical outlet. Make any kind of stamp. We'll send you free information without obligation about this established, highly profitable business. ***We'll even help finance your start.*** For free information send name and address today on a postcard to:

Rubber Stamp Div., 1512 Jarvis, Dept. R-3-BX, Chicago, Ill. 60626

You Can Have a HE-MAN Voice

STRENGTHEN **your** voice this tested scientific way. Yes—you may now be able to improve the POWER of your speaking and singing voice . . . in the privacy of your room! Self-training lessons, mostly silent. No music required.

FREE BOOKLET

Write **today** for Eugene Feuchtinger's great booklet "How to Develop a Successful Voice." It's absolutely FREE! You must state your age. Booklet mailed postpaid in plain sealed envelope. No salesman will bother you. Send your name and age RIGHT NOW!

PREFECT VOICE INSTITUTE, 325 W. Jackson Blvd., Studio BV-1, Chicago 6, Ill

INVENTORS

PATENT SEARCHES IN U.S. PATENT OFFICE
Patent Development Engineering and Patent Sales Promotion
Send for Free Invention Certificate and Patent Information

GEORGE SPECTOR Licensed Patent Engineer
U.S. Patent Office Former Examiner, 3615 Woolworth Bldg., New York

Build This Beautiful
Grandfather Clock

We show you how at price you can afford. Send only $1.00 for complete plans and instructions plus catalog of clock movements, dials, blueprints and kits for constructing Grandfather, Grandmother, Terry and other fine clocks.

MASON & SULLIVAN CO.
DEPT. PS OSTERVILLE, MASS.

ELECTRONICS

COYNE ELECTRONICS INSTITUTE

A quarter million dollars worth of equipment. Non-Profit Institute—Est. 1899. Courses: Electronics • Electricity • TV-Radio • F.C.C. • Electronics Engineering Technology. Mail coupon or write for FREE BOOK, "Your Opportunities in Electronics." No Salesman will call.

COYNE ELECTRONICS INSTITUTE Educ. Serv. Dept. 26-P
1501 W. Congress Parkway, Chicago, Ill. 60607

NAME_____PHONE_____

ADDRESS_____AGE_____

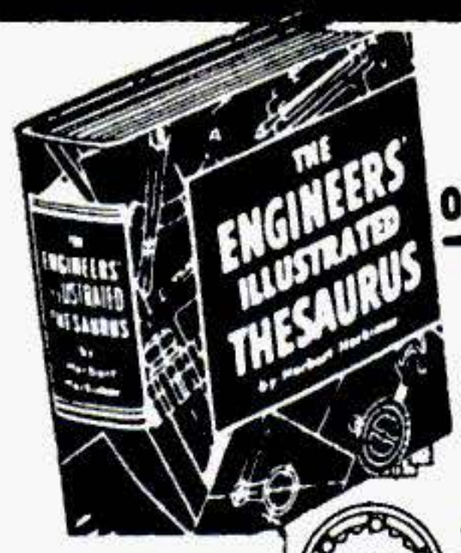
CITY_____STATE_____

Copyrighted material

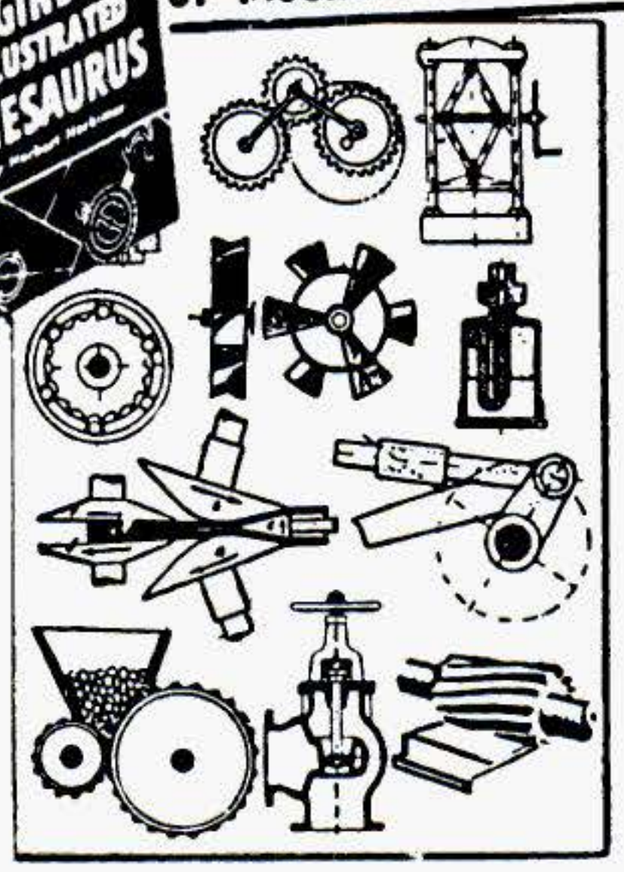
Here You Can Find a Solution to Practically ANY MECHANICAL PROBLEM!

PARTIAL CONTENTS:

Accumulators
Air Conditioners
Alarms
Amplifiers
Anchors
Anti-Friction
Baffles
Ball Joints
Bearings
Bed Plates
Blowers
Brakes
Burners
Cams
Chains
Chain Gears
Checks
Chucks
Circular Motions
Clamps
Cleaners
Clutches
Compressed Air Power
Connecting Rods
Conveyors
Cooling
Cotters
Counters
Covers
Cranes
Cranks
Crushing
Cutting
Derricks
Diesel Power
Drilling
Electric Power
Electron Tubes
Elevators
Engines
Expanders
Fasteners
Feeders
Filters
Gauges
Gears
Generator
Governors
Grinders
Grips
Guides
Heating
Humidifiers
Hydraulic Power
Indicators
Infra-Red
Keys
Levers
Loaders
Links
Locks
Lubricators
Magnetism
Measuring
speed
heat
pressure
Mixing
Motors
Nozzles
Parallel Motions
Pawls
Pipes
Pivots
Propulsions
Pumps
Raisings
Ratchets
Refrigeration
Reciprocating Motion
Regulators
Rocket Propulsion
Safety Devices
Sanitation Devices
Scales
Sea Wave Power
Separators
Shafting
Shifting Gears
Shields
Shock Absorber
Sifting
Signals
Slides
Slings
Sounds
Springs
Startings
Steam Power
Stokers
Swivels
Striking
Sound Receivers
Tappets
Thermostats
Traps
Valves
Vaporizers
Washing
Winding
etc.



A BOOK with OVER 8000 ILLUSTRATIONS WITH DESCRIPTIONS of Mechanical Movements, Devices, Contrivances and Details



A copy belongs in every reference library, school—every shop, plant, factory—with every machinist, engineer, student, inventor

No. 501. If you work with machinery of any kind, you may be called upon to devise or improve some job or motion. To do this, you either have to rely on memory, experience or ingenuity. Here in this new book—THE ENGINEERS' THESAURUS by Herbert Herkimer—you will find over 8,000 IDEAS and SUGGESTIONS for accomplishing any kind of motion, force or work: It is a compilation of the contrivances, parts, details, tools, machines, devices and means—devised and developed by countless engineers, machinists and inventors over the years—to effect any motion or task.

The material has been painstakingly assembled and classified, from many sources— research books, engineering brochures, patent drawings, catalogs, etc. It is, by far, the **largest collection** ever gathered in one book—and the only one which shows, side by side, the many different means and methods for accomplishing any particular task!

Each item, each device, each method is illustrated—there are 8,000 such illustrations—and each one carries a pertinent description of its makeup and function. THE ENGINEERS' THESAURUS is a monumental work. It is 5½ x 8½ inches. 580 pages, printed on coated paper, cloth-bound.

Each one of these "ideas" is practical—just one may save you a lot of "headache"—save on your costs—add to your profits!

Order by Mail. Positive guarantee of money-back-if-not-satisfied. **Price only $5.95**

HOME REPAIRS MADE EASY

No. 3164. Save hundreds of dollars in home repairs. Learn how simple and easy it is to repair your own roof, windows, doors, floors, walls, ceiling, painting, plumbing, heating, electrical work, furniture repairs and much more. This new book also describes various tools, their use and care. Send for it NOW and start saving $$$. A "MUST" for home-owners. **Only $2.00 postpaid.**

Mechanical Drawing

(Self Taught)

No. 3118. This sensational new book can help you become an expert draftsman. Contains the latest up-to-date, authoritative instructions and methods. 21 step-by-step illustrated drawings teaches you how to scale drawings, hand letter, use of the French curve and the use of other mechanical drawing instruments. It's easy to achieve perfection in mechanical drawing. **Only $2.00 postpaid**

A STEP-BY-STEP GUIDE TO DOING MAJOR CARPENTRY WORK

No. 1512. HOW TO BE YOUR OWN CARPENTER by the syndicated columnist Carlson Wade reduces every conceivable carpentry job into a few easy steps. — Framing either for rooms, floors, ceilings, roofs, or partitions is completely systematized; in simple steps you build the sills, then the girders, joists, trusses and other components, until the frame is finished before you know it. — The book shows you how to build and plumb straight any wall from its bottom plate through its studs and headers. It gives you the 6 steps needed to build window frames, the 13 steps to build door frames, the 5 steps to beautiful stairs, the 3 steps to dry wall installation, the 6 to ceiling construction. — The guide shows you how to construct roofing dormers and contains a special chapter on typical home repairs involving windows, flooring, walls, roofs, doors and other tricky jobs. **Only $2.95 postpaid.**

How to REPAIR YOUR CAR

Save Money on Auto Repairs. Do it yourself.

No. 3162. You'll find everything covered, from Ammeter to Voltage Regulator plus chapters on emergency repairs, tools and equipment, a price list of various repairs, preventive maintenance measures, buying parts new and rebuilt. **Only $2.00 postpaid**

Turn your SPARE-TIME IDEAS into Profits!

No. 3148 "The Inventors Complete Guide Book" tells in detail, how to; develop & protect your ideas; get a patent; sell your inventions; approach big corporations with your ideas . . . everything for the inventor is completely covered! **PLUS** — A complete list of hundreds of vital inventions just waiting to be created & patented. **Only $2.00 postpaid**

PADELL BOOK COMPANY — Dept. PS-2
817 Broadway, New York, N. Y. 10003

Please send me the books encircle below. If I am not satisfied I can get my money back. I enclose $.....in payment.

Name.....
Address.....
.....

501	1512
3164	3162
3118	3148

LET THIS MACHINE FOR ONE EVENING...

and your friends will gasp in astonishment at the feats of "Mental Magic" you can perform that very next morning

By HARRY LORAYNE

For example, which of these seven "Mind-Power Miracles" would you like to accomplish—not by torturous study for weeks and even months as you'd do today—but simply by playing a fascinating question-and-answer game WITH A MACHINE for as little as a single evening.

Take your choice! You can:

1) DOUBLE YOUR MEMORY FOR NAMES AND FACES — in that very first evening alone!

2) MAKE ANYBODY LIKE YOU, from the very first moment they meet you!

3) BUILD A WILL OF IRON, that smashes obstacles right out of your path, skyrockets your earning power.

4) DEVELOP POWERS OF X-RAY OBSERVATION that will astound your friends!

5) MAKE BAD HABITS BREAK THEMSELVES, even if they've plagued you for years!

6) FLASH-LEARN ANYTHING YOU WISH, even absorb whole books in as little as thirty minutes!

7) AND MAKE FEARS AND WORRIES VANISH INTO THIN AIR, *automatically, simply by answering the questions that this machine asks you — almost exactly as though you were doing a cross-word puzzle or carrying on a conversation with a friend!*

Sound Impossible? Not At All! NOT WHEN THE MACHINE TEACHES YOU THESE SIMPLE TRICKS!

Let me explain: If you are a reader of this paper . . . if you can understand these words . . . *then you have brain power RIGHT NOW to accomplish any one of these seeming "miracles" you wish — without spending more than a single evening to prove it to yourself beyond doubt!*

Why? BECAUSE EVERY ONE OF THESE ACCOMPLISHMENTS IS A TRICK! And using this machine, I can teach you that trick in as little as a single evening!

For example, the secret of building a file cabinet memory *is a simple mental trick!* Using this machine I can teach it to you in approximately fifteen minutes!

The secret of making anybody like you — of towering over others through the power of your personality and your intellect — *is a trick! Using this machine I can teach it to you in less time than it now takes you to watch an ordinary TV program!*

Yes! And the secret of breaking out of the prison of old habit-patterns that have been crippling you for years . . . of filling every day of your life with irresistible new enthusiasm and self-confidence . . . of doubting the amount of work you can squeeze out of every hour and skyrocketing your income overnight IS A TRICK! USING THIS MACHINE I CAN TEACH IT TO YOU IN AS LITTLE AS A SINGLE EVENING.

Here's why! Here's why I say that this machine teaches you up to TEN TIMES AS FAST as any book you will ever pick up!

Here's why it has you performing feats of mental magic — THAT YOU LITERALLY WOULDN'T HAVE BELIEVED POSSIBLE ONE SHORT HOUR BEFORE!

15 Minutes Of Pleasure Every Evening — —To Build the Powerhouse Mind Of Your Dreams!

For example, let's say that tomorrow night you wanted to actually DOUBLE your power to remember names and faces — *and astonish your friends, your employers, your fellow-workers with that new-found ability THAT VERY NEXT MORNING!*

Then all you do is this —

Simply insert in the machine the first section, on Memorizing Names and Faces! Instantly — automatically — in the small window at the top of the machine — you are shown Secret Number One of developing a "Photographic-Memory"! *A simple five-second trick that lets you "mentally-photograph" anyone's face you happen to meet — feature by feature — till it's almost impossible for you to forget it!*

Then — in that exact same moment — the machine moves on to show you how to take that same person's NAME, *and turn it instantly into a picture!* And then burn that picture-name into your memory so vividly that it will be virtually impossible for you to look at that face without having the name spring automatically to the tip of your tongue!

All this, in minutes! And then the machine moves on again, to let you prove this new-found power to yourself — instantly! Because now the machine introduces you to FIFTEEN names and faces, exactly as if you met them at a party . . . gives you the key to burning each one of the identities indelibly into your memory . . . then shows you the faces again — *this time without their names!*

And when you discover that everyone of those fifteen names automatically pops into your memory the moment you glance at each face again . . . when you realize that you now have at your command the strongest single tool ever invented for winning the respect and admiration of anyone you ever meet — A VIRTUAL "PHOTOGRAPHIC MEMORY" FOR NAMES AND FACES THAT YOU HAVE ACQUIRED FOR LESS THAN A SINGLE HOUR'S PLEASURE — *then you will begin to sense the incredible power of this new Machine-Method of learning!*

And this is just the beginning!

Now the Machine Moves On! To Build You A File-Cabinet Memory In A Dozen Different Ways!

Now — slip into the machine the sections on Doubling Your Power to Learn . . . on absorbing facts and figures as fast as you can run your eye down the print-page! Instantly, you're shown the secret of turning NUMBERS into pictures, and burning those picture-numbers — telephone numbers, for example — into your mind so perfectly that you can amaze forty of your friends at a party by reeling off their telephone numbers, one after the other, *as rapidly as if they were printed on the wall in front of you.*

In minutes, you learn how to memorize whole price lists, appointment schedules, shopping lists, speeches, sales presentations, highlights of important articles — all in perfect order, frontwards and backwards, so that when you've finished one point the next point automatically springs to your mind!

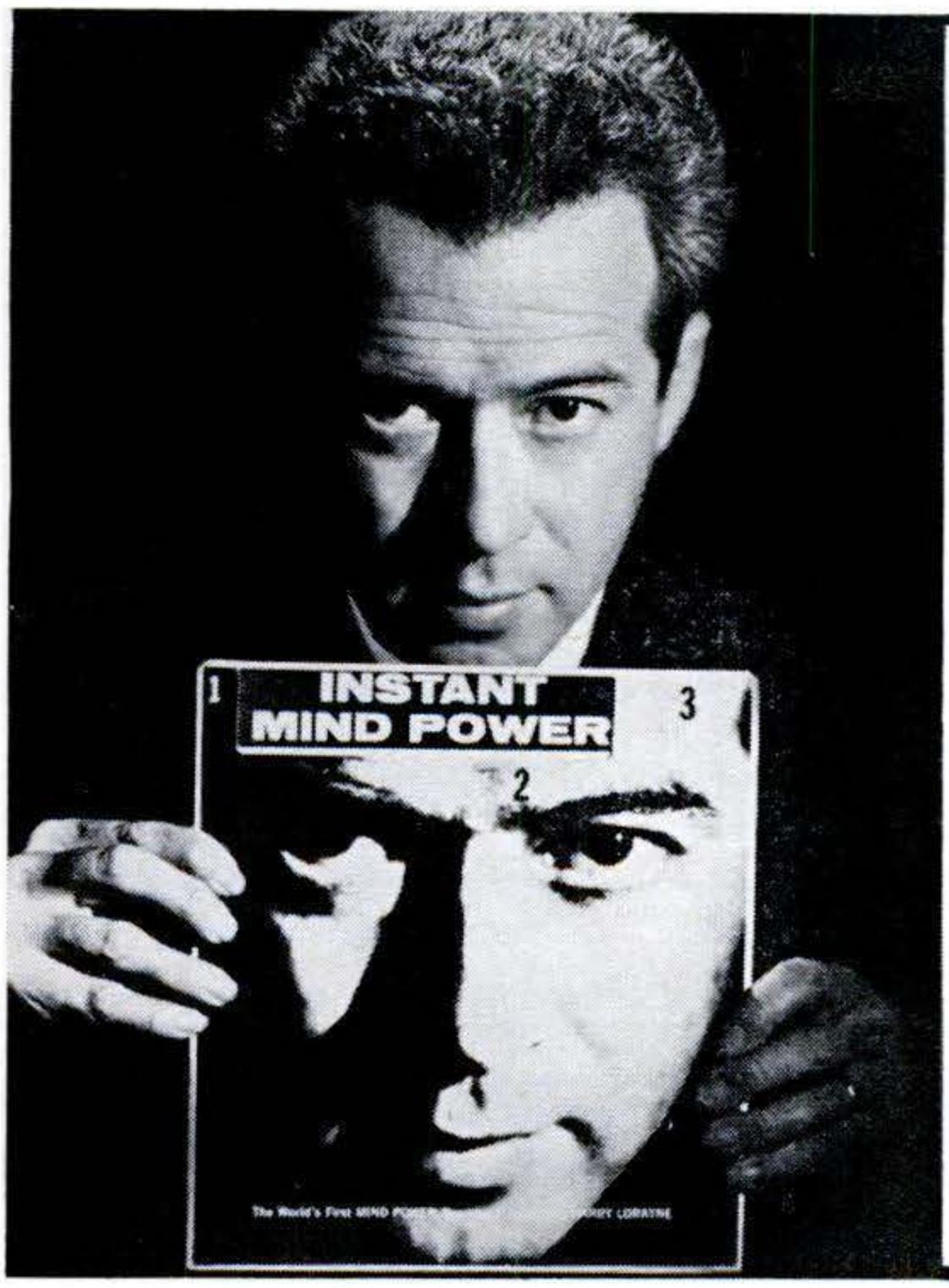
And then the machine moves on again, to *put this new memory-power to work in absorbing whole books and conversations for you!* One simple trick alone gives you a virtual "tape-recorder memory" for the spoken word — to let you impress your superiors at work by repeating back to them their most casual instructions, step by step . . . *to win dozens of new friends by quoting, almost word for word, from conversations you had with them months before!*

Yes! And another of these secrets *actually cuts your reading time in half!* Lets you absorb the key ideas of most books in as little as thirty minutes! Burn a magazine article into your memory in five minutes! Flash through a business report in three minutes! *And dazzle others with your mastery of this*

EXECUTIVE RESEARCH INSTITUTE, INC.

Copyrighted material

WORK ON YOUR MIND



HOW WE PACKAGED A GENIUS — TO SHIP HIM INTO YOUR HOME!

This is Harry Lorayne—the man with the most incredible memory in the world—the man who can remember the names and faces of OVER SEVEN HUNDRED PEOPLE in a single evening, after meeting each one of them only once!

Perhaps you have watched Mr. Lorayne on the Jack Paar, Johnny Carson or other television programs! Perhaps he has lectured on Mind Power before your club, or fraternal association, or business firm, just as he has for IBM . . . U. S. Steel . . . General Electric . . . RCA . . . Standard Oil . . . and over a thousand others!

Or perhaps you are one of the over a third of a million people who purchased Mr. Lorayne's two great books on skyrocketing the power of your thought and your personality!

But now Harry Lorayne has gone beyond teaching Mind Power Improvement in a book! Now Harry Lorayne has achieved a break-through that may revolutionize Mind Power Improvement for every man, woman and child in this country!

Now Harry Lorayne has taken his COMPLETE Mind Power Course—designed to strengthen ALL ELEVEN vital functions of your mind—and built that course into an amazing Mind Power Machine THAT VIRTUALLY REMOVES WILL POWER or "STUDY" FROM SELF-IMPROVEMENT! That teaches you these secrets simply by engaging you in conversation about them! That lets you "talk" your way to a Bulldozer Mind, in far less time than you ever believed possible!

And that actually works better if you do not try to study or memorize it at all—so that the machine, and Harry Lorayne, CAN DO ALL THE REAL WORK FOR YOU!

Read the thrilling details on this page! Prove it yourself, in your own home, entirely at our risk! Send in The No-Risk Coupon—TODAY!

material that very same night — or as much as five years later if you choose!

And this is still just the beginning!

Again the Machine Moves On! To Double Your Power To Bend Others To Your Will!

Now you load the machine with the "Personality Programs!" The four sections loaded with tricks that:

1) MAKE ANYBODY LIKE YOU, from the first four words that you speak! Gain immediate attention at any gathering, before you even begin to talk! Get other people to listen to no one but you! Avoid the everyday blunders that automatically antagonize people! Handle embarrassing situations, without losing the other person's respect! Turn opponents into friends! Build fierce loyalty to yourself, wherever you go! *Get others to do exactly what you want them to do — and love doing it for you!* And much more!

2) DEVELOP A WILL OF IRON that won't take no for an answer! Smash through obstacles that are impassable to ordinary men! Overcome the memory-chains of past failures that are crippling you today! *Find time to do anything you want, and turn your dreams into reality overnight!* And much more!

3) BANISH FEAR AND WORRY FROM YOUR LIFE! Harness those very worries that are holding you back today — put them to work — get other people to shoulder them for you! Find the "fear-behind-the-fear" and get rid of it! *Turn big "failures" into little successes — automatically!* And much more!

4) MAKE YOUR WORST HABITS BREAK THEMSELVES! By using the seven "sneak attacks" that literally SHATTER even the most deadly habits — whether they may be smoking, drinking, overeating, insomnia, nervousness and all the rest! *Plus a startling new way to weld power-packed NEW habits into your character automatically — make them an automatic reflex, almost overnight!*

Prove It Yourself Entirely At My Risk!

Plus whole sections on creating winning ideas . . . making difficult business and personal problems solve themselves . . . developing "X-Ray" powers of observation that tell you hidden secrets ordinary people never even see at all . . . *even the latest executive techniques of making fast, forceful decisions that are radar-right!*

And all eleven courses — in one great machine — yours without opening a single book . . . reading a single page . . . or memorizing a single rule! Only $6.98 complete! Full money-back guarantee! Order today!

119 FIFTH AVENUE
New York, N.Y. 10003

MAIL NO-RISK COUPON TODAY

EXECUTIVE RESEARCH INSTITUTE, Inc.
Dept. 6 PS-1
119 Fifth Avenue, New York, N.Y. 10003

Gentlemen: Yes, I want to try Harry Lorayne's amazing new MIND-POWER MACHINE, entirely at your risk. I am enclosing the low introductory money-back guarantee price of only $6.98 complete. I will use this revolutionary new machine for a full 30 days at your risk. If I am not completely delighted . . . if it doesn't do everything you say, I will simply return it for every cent of my money back.

☐ If you wish your order sent C.O.D. Check Here! Enclose $1 good-will deposit. Pay postman balance, plus postage and handling charge. Same money-back guarantee, of course.

Name _____
(Please Print)

Address _____

City _____ State _____ Zip Code _____

© Executive Research Institute Inc. 1966

Copyrighted material

SECRETS of Teaching Yourself MUSIC

revealed in your own home this money-saving way

YES! Teach yourself Piano, Guitar, Accordion, Sax, ANY instrument—even if you don't know a single note now! No special "talent," no previous training needed. Famous low-cost U.S. School of Music Course, with step-by-step pictured lessons, make it simple as A-B-C. Everything is in print and pictures. First you are told what to do. Then a picture shows you how. No boring exercises, no tedious scales. You start by playing actual **pieces.** Sooner than you may imagine you'll amaze friends by playing your favorite music -show, pops, classical jazz, country music, dance tunes, etc. Over 1 256,000 students all over the world.

Stop Cheating Yourself of These Joys

Popularity New friends. Gay parties. Musical career Extra money. Banish worries frustrations. Satisfy self-expression, creative urge Gain self-confidence.

Write today for 36-page illustrated FREE book. **U.S. SCHOOL OF MUSIC, STUDIO** 152, Port Washington, N. Y. 11050. (Est. 1898, Licensed by N. Y. State Education Dept.)

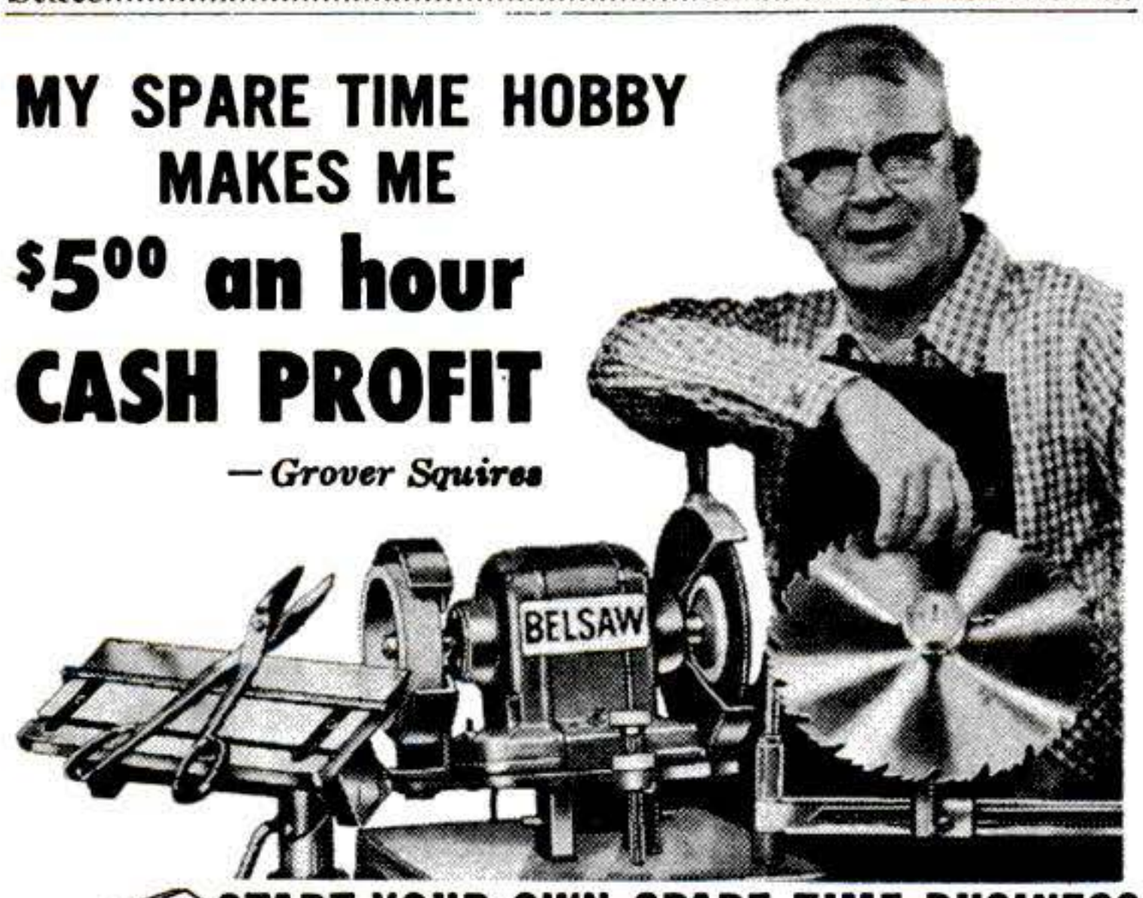
Name.....

Address.....

City & State..... Zip Code.....

MY SPARE TIME HOBBY MAKES ME $5.00 an hour CASH PROFIT

—Grover Squires



START YOUR OWN SPARE TIME BUSINESS

You can turn your spare time into Big Cash Profits with your own **COMPLETE SHARPENING SHOP . . .** Grind saws, knives, scissors, skates, lawn mower blades . . . all cutting edges. Your Own Cash Business with no inventory . . . right at home . . . no experience needed.

FREE BOOK tells how you can start your own spare time business while you are still working at your regular job. Low Cost — time payments only $15.00 a month. **Send coupon today.**

BELSAW SHARP-ALL CO., 706H Field Bldg., Kansas City 11, Mo.
Send Free Book "LIFETIME SECURITY". No obligation.

Name_____

Address_____

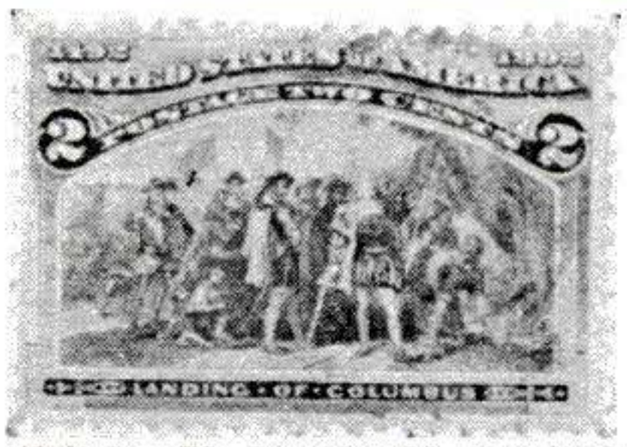
City_____ State_____

FREE MUSCLE COURSE!

Trade in that skinny scrawny, milk toast or overweight body of yours for a new Weider Jet-Charged body, rippling with mountains of muscles loaded with energy, drive and virility, the envy of every man and admiration of every woman, **now!** In 15 minutes I'll prove you can slap on 4 inches of muscles to your chest,—3 inches to each arm—give you life-guard shoulders, trim your waist to athletic size—give you speedy athletic legs. I don't care if you're short or tall, (skinny or fat) young or not so young, expect a muscle building miracle when you send for my FREE course. Send only 25 cents to cover postage and handling and write to the Trainer of "Mr. Universe", "Mr. America", "Mr. Europe".

JOE WEIDER, Dept. 100-26D
531 32nd St., Union City, N. J.

UNITED STATES HISTORICAL STAMP COLLECTION
Only 10c



Includes 1893 Columbian plus 24 different commems, plus U.S. Mint and USED stamps included on approval. Send 10c.

K & B STAMP CO., Dept. "S," Box 70, Brooklyn 23, New York

RUPTURED?

TEST THIS TRUSS FREE FOR 30 DAYS

Wear a Web for strong support and lasting relief of reducible inguinal rupture. If not satisfied after 30-day trial, purchase price refunded in full. Write now for free book on rupture care.

WEB TRUSS Co., Dept. PS-2, Hagerstown, Md.

PROFIT *IN YOUR SPARE TIME*

SMALL ENGINE REPAIR PAYS BIG!

Outboard • Powermower • Chain Saw • Tractor

MAKE EXTRA MONEY **— or fix your own engines and SAVE! Illustrated, easy-to-learn Home Study Course qualifies you as expert. Free information. Write today!**

LINCOLN TECHNICAL INSTITUTE
SUITE 2-G, 472 MARKET STREET, NEWARK 5, N.J.

BUILD YOUR OWN CAMPER AND SAVE!

Complete, easy to follow Camper Plans, instructions, materials list **$3.95**

PICKUP COVER PLANS with removable rear panel **$2.00**

EQUIPMENT CATALOG Refundable on first order. **$1.00**

Also Factory Built Units

SATISFACTION GUARANTEED!
Send Check or M.O.—For Details Send Dime!

MAIL TODAY ☐ CAMPER ☐ COVER ☐ CATALOG

NAME.....

ADDRESS.....

CITY..... STATE.....

VIKING CAMPER SUPPLY 94-JD Glenwood Ave. Minneapolis, Minn. 55403

Copyrighted material

for perfected performance and styling leadership

look to Glastron in '66

Watch for the flat wake of a Glastron. It's solid evidence of the smoothest, most stable ride on the water. Glastron's exclusive Aqua-Lift hull slices deeper through crests, rises quicker to full plane. It holds course steadier and rides safer through the roughest water at all speeds.

Only Glastron, the year's-ahead leader in the development of the deep-V, brings you this perfected performance.

Look for the bold new racing stripe on the Glastron. It marks the industry's leader in luxury styling and design, the Super Sport. Glastron offers 7 outstanding Super Sports in '66.

Try them — 20 Aqua-Lift models — 14 to 23 feet — outboards and stern drives. That's Glastron for '66.

GLASTRON

GLASTRON BOAT COMPANY
Dept. S26, P. O. Box 9447
Austin, Texas
Please send free, full color brochure

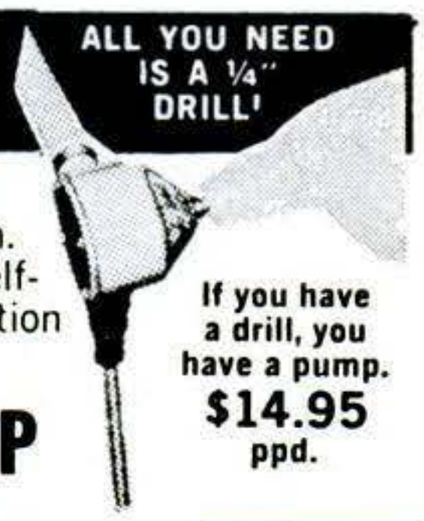
Name_____

Address_____

City_____ State_____ Zip_____

PUMP 6 GALLONS per MINUTE with your Electric Drill!

ALL YOU NEED IS A ¼" DRILL!



Quick, easy liquid transfer for auto, industry, marine, home and farm. Change engine oil, gear box oil. Self-priming. Complete with 4 sizes of suction hose and all accessories.

If you have a drill, you have a pump.

$14.95 ppd.

MEREDITH DRILL PUMP

Tiger HORN

Like the blood-curdling roar-snarl of a powerful tiger. A high quality horn for any car, 6 or 12 volt (specify).

New electronic development. For the driver who wants something really different. Satisfaction guaranteed.

$16.95 ppd.

MEREDITH/COUNTRY CLUB CO.

MUSTANG HORNS—$14.95 ppd.
BULL BELLOW HORNS—$15.95 ppd.

SEND for OUR AUTO & TOOL Catalog

4000 VOLTS at the End of a 10-oz. 29" Cane

The Police "Shock-Rod" has power to control the most stubborn adversary . . . is ideal protection from nasty dogs. Also effective in riot work.

SAFE TO USER

FULLY TRANSISTORIZED

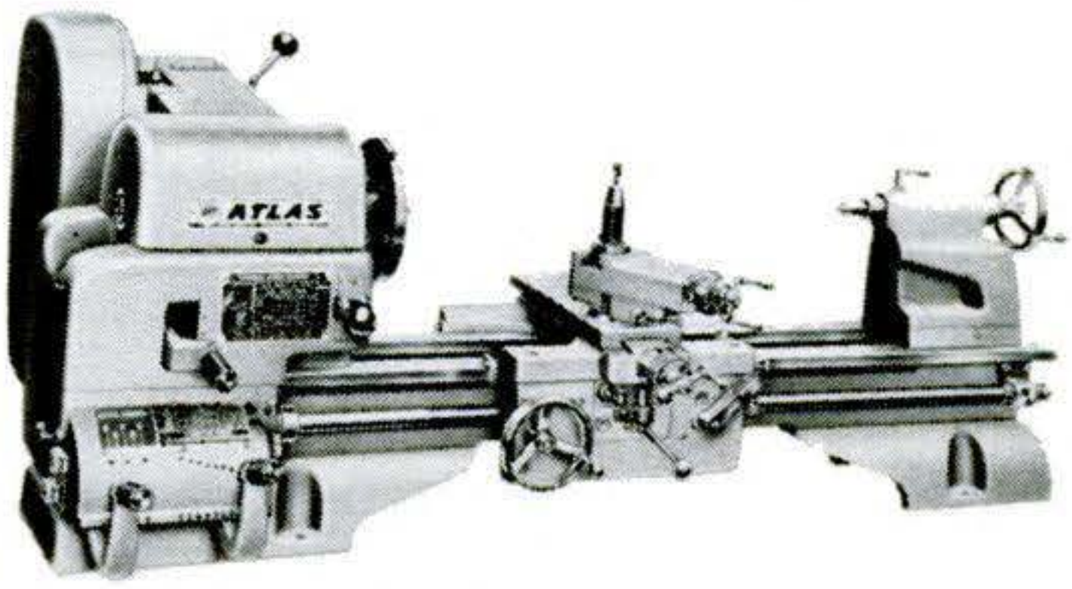
Circuit converts electricity into safe but huge voltage. No moving parts. Rugged. Absolutely guaranteed.

Harmless to adversary. The current is tiny (from two small c-size cells) but high voltage gives kick. Shorty Model same price as regular walking stick.

$14.95 ppd.
2 for $27
Bats., Inc.

MEREDITH SEPARATOR CO.
Country Club Division
Cleveland, Mo.
(Missouri)
64734

Get more for your $$



with ATLAS 12"

- **Quick change gear box with 54 threads and feeds**
- **16 spindle speeds—V-belt drive**
- **Power cross feed—power longitudinal feed**
- **Timken tapered roller bearings**
- **12¼" swing—big capacity**
- **And more—from only $485 f.o.b. factory**

Write for free catalog

ATLAS PRESS CO.

2-25 N. Pitcher St. • Kalamazoo, Mich.

507

Copyrighted material

It must be Amphora

Full aromatic pipe tobacco red pack

Full aroma for full pleasure. Light, mild, cool and slow-burning all the way. All bliss, no bite. Still only 40¢ a pouch. Amphora also comes Regular (Brown) and Mild Aromatic (Blue). Each carefully blended and packed in Holland by Douwe Egberts Koninklijke Tabaksfabriek.

SPECIAL OFFER: Imported Stainless Steel 3-in-1 knife-style pipe tool plus pouch of AMPHORA: $1.00. Mail to Romick's, Int'l., Inc. Dept. C, P.O. Box 3033, North Hollywood, Calif.

NEW! 100 WORLDWIDE STAMP COLLECTION just released

plus WINSTON CHURCHILL MEMORIAL ISSUE

GET THIS giant new collection of 101 different stamps — from the world's far corners. NEW ISSUES — commemoratives, pictorials, multi-colors. Lincoln, JFK, Churchill — Tristan da Cunha, Afghanistan, Rwanda, many more. PLUS exciting older issues showing beasts of prey, ancient life, jungle scenes. Supply limited. All only 10c. EXTRA! Other exciting stamps to examine; returnable, no obligation.

GARCELON STAMP CO., Dept. 2PS7, Calais, Maine

GARCELON STAMP CO., Dept. 2PS7, Calais, Maine
Enclosed is 10c. Rush 101 Worldwide Stamp Collection. EXTRA! Other exciting stamps to examine; returnable, no obligation.

. . . . . .

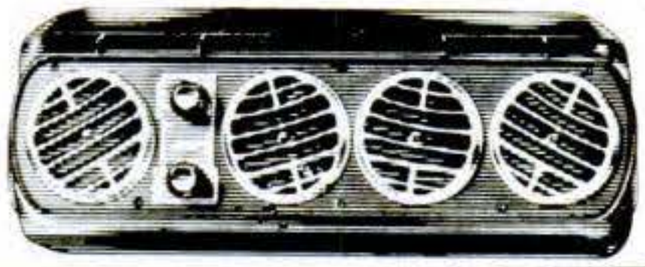
. . . . . .

. . . . . .

SAVE $80 DOLLARS

AIR CONDITION YOUR OWN CAR

Easy. We supply everything you need: Kit, tools, illustrated step-by-step instructions. Just 5 hours to install. Made by leading auto air conditioning manufacturer. 12 month, 12,000 mile warranty. Our price to you just $149 (you save at least $80). Fits all U. S. cars. Send $1 for complete instructions, applicable against purchase price. Please state size of engine, make and year of car.



FREE LITERATURE
COMFY-KIT ®
1707 E. Ohio Street
Dallas, Texas
Dept. PS-1

BUY FACTORY DIRECT!

WREN **MINI-BIKE! $119.95**

Send 25c for brochure
Many Models
$10.00 crating

$10.00 Down
$6.00 a Month
Complete with Clinton 2½ H.P. engine

Order Now!

Bird Engineering, Box 427, Dept. PS-WK-2 Omaha, Nebr.

I-N-V-E-N-T-O-R-S

WE NEED INVENTIONS

Sell your invention for cash—need money for patent?—Are technical problems holding you back? Universal inventions has helped inventors all over the world—just like yourself—why not you? Inventions provide the magic spring-board to sudden riches. REMEMBER, we either sell your invention or pay you a cash bonus. Write for details

UNIVERSAL INVENTIONS, Dept. 12, Marion, Ohio

LEARN IBM

AT LAST! With **THOUSANDS** of prestige positions waiting for new data processing technicians and **PAY** scales at a **RECORD HIGH,** A.T.C.'s exclusive methods are available to you in a **SPECIAL HOME STUDY PROGRAM GEARED TO YOUR TIME AND BUDGET.** No contracts to sign . . . you pay for each lesson only when you order it! Send for free logic test to see if you can qualify. **No Cost or Obligation of course.**

AUTOMATION TRAINING CORPORATION
7023 E. Kirby, Dept. PS-50, Detroit 11, Mich.

BILL TROUBLES?

APPLICATIONS ACCEPTED UP TO $9000.00
BAD CREDIT–NO PROBLEM–NOT A LOAN CO.
SEND NAME FOR FREE APPLICATION TO NEAREST OFFICE FOR FASTER SERVICE

ATLANTIC ASSOCIATES
146 WESTMINSTER ST., PROVIDENCE, R. I.
3312 N. CENTRAL AVE., PHOENIX, ARIZONA

PROTECT YOURSELF! **TEAR GAS** NO PERMIT REQUIRED

TEAR GAS GUN OUTFIT

This all-steel, .22 cal. TEAR GAS gun shoots 6 times as fast as you can pull the trigger. Also fires blanks for alarm, or dog training, and flares for emergencies. Complete with 6 tear gas shells and instructions.

BLUE STEEL $9.98
CHROME 11.98

TEAR GAS PENS

This handy size chrome pen shoots the new powerful .38 spec. MAGNUM cartridge. Will halt an attacker – in his tracks, renders him helpless while you summon aid!
Complete with 2 shells $9.98
As above, two shot with 2 shells 11.98
.22 cal., single shot with 3 shells 4.98

☐ Gun $9.98 ☐ Gun $11.98 ☐ Pen $4.98 ☐ Pen $9.98 ☐ Pen 2-Shot $11.98
☐ Holster $2 ☐ .38 Shells Ea. .99c ☐ .22 Shells 10-$1.50 ☐ Flares 6-$1.50 ☐ Blanks 100-$1.50

ORDER NOW! Mark Items You Want. Send Check or Money Order to:
TEAR GAS DEVICES CO. 136 Madison Ave., St. Louis, Mo. 63122
Pre-Paid in U. P. S. areas. Others Express Collect (No C. O. D.'s)

Copyrighted material

Learn DRAFTING at home

SAY GOODBYE TO THANKLESS, LOW-PAY JOBS!

GOOD NEWS for men working in low-paying, no-future jobs. We offer you the opportunity, without a penny of cost, to find out what it takes to become a draftsman.

The Draftsman is the key man in industry Practically everything that is built or manufactured is constructed from drawings prepared by the draftsman. Machines can never replace his skilled work. Today there is a shortage of men trained in drafting and the nation's fast technical growth will require many more. This adds up to good salaries and job security for the trained draftsman.

Work is clean, pleasant Drafting is interesting, professional work—the kind you'll like. As a draftsman, you will command respect in business and community activities, enjoy more of the good things of life through additional earnings, and be able to look forward to promotion and a secure future.

Drafting does not require unusual talents or artistic ability. So if you're discontented in any way—or concerned about your future—consider the advantages of this high-pay field. Chicago Tech's practical method of teaching makes it easy for you to learn drafting at home in your spare time.

YOURS FOR THE ASKING

So get the facts right away about Chicago Tech's college-level training at home —plus a free trial lesson. See for yourself how your own natural abilities measure up to the needs of this high-paying profession. Learn how you can become a draftsman the Chicago Tech way. Act now! MAIL THIS COUPON TODAY.

SEND FOR FREE TRIAL LESSON AND ILLUSTRATED BOOK

CHICAGO TECHNICAL COLLEGE
ESTABLISHED 1904
Accredited Member Nat'l. Home Study Council

B-234 Tech Bldg., 2000 So. Michigan Ave.
Chicago, Ill. 60616
Yes, please send Free Trial Lesson and illustrated book on drafting and its opportunities. No obligation.

Name_____ Age____
Address_____
City_____ State_____ Zip____

U.S. GOV'T SURPLUS

DIRECT FROM GOV'T. FOR ONLY A FRACTION OF ORIGINAL COST. BUY FOR AS LITTLE AS 2¢ AND 3¢ ON THE DOLLAR!!

Examples:

JEEPS $63.00
BOATS $178.00
BICYCLES $5.50
TELESCOPES $4.00
LEATHER BOOTS 65¢
TYPEWRITERS $8.79
AIRPLANES $159.00
REFRIGERATORS $5.00
PASS. BUSSES $208.00

COMPLETE SOURCES AND INFORMATION ON HOW YOU CAN BUY THOUSANDS OF ITEMS FROM GOV'T—ONLY $1.00

FREE!! FREE!! EXTRA 48 PAGE SECTION WITH PICTURES AND PRICES OF MORE THAN 500 ITEMS. YOU CAN ORDER DIRECT BY MAIL AT RIDICULOUSLY LOW SURPLUS PRICES. YOURS FREE WHEN YOU SEND $1.00 FOR THE DIRECTORY.
THIS IS THE WORLD'S LARGEST STOCK!!

RIFLES 10.95
PARACHUTES 21.95
BOATS 16.45
SHOES 1.65
JACKETS 3.25
TENTS 6.55
BAYONETS 2.15
HAND GRENADES 1.60
COMMANDO KNIVES 1.38
COMPASSES 1.05
HOLSTERS 2.15
MACHETTES 2.15
GOGGLES 61c

PISTOL BELTS 1.05
STEEL HELMETS 2.15
GIANT BALLOONS 1.38
MODEL CANNONS 1.38
BAYONETS 1.65
CARTRIDGE BELTS 1.05
STEEL AXES 2.70
CANTEENS 67c
FOLDING STOVE 1.38
FIELD PACK 1.05
MIRRORS 61c
FIELD JACKETS 3.25
AND Bunk Beds,

Life Rafts, Walkie Talkies, Swords, Paratrooper Boots, Flags, Sleeping Bags, Cots, Phones, Mine Detectors, Bugles, Hand & Leg Irons, Blankets, Bullet Proof Vests, Flares, Cartridge Belts, Ammo, Rifle Scopes, Maps, Shovels, Canteens, Saddles, First Aid Supplies, Sunglasses, Mess Kits, Haversacks. AND HUNDREDS MORE

BUY ONE, TWO OR A DOZEN OF ANY ITEM YOU WANT.
MINIMUM ORDERS AS LOW AS $5.00 ACCEPTABLE

FREE HOME TRIAL COUPON

SURPLUS BARGAINS, DEPT. 135-2
605 THIRD AVENUE
NEW YORK 16, N. Y.

I enclose $1.00. Send the combined catalog and directory immediately. I understand that my money will be refunded if I am not completely satisfied. Also I will receive a full refund with my first order of $10.00 or more.

Name_____
(Please Print)
Address_____
City_____ State_____

FULL PURCHASE PRICE OF $1.00 REFUNDED WITH FIRST ORDER OF $10.00 OR MORE

Copyrighted material

champing at the bit for a really cool pipe?

LIGHT UP A

Kirsten

Kirsten's patented Duralumin Radiator stem not only produces a cooler draw, but condenses out harsh and harmful tobacco impurities. Moisture easily is removed with a flick of the exclusive Kirsten valve. Featherweight Sportsman model features premium imported Mediterranean briar and hand-finished vulcanite bit. Order yours by mail today. Just $7 Postpaid.

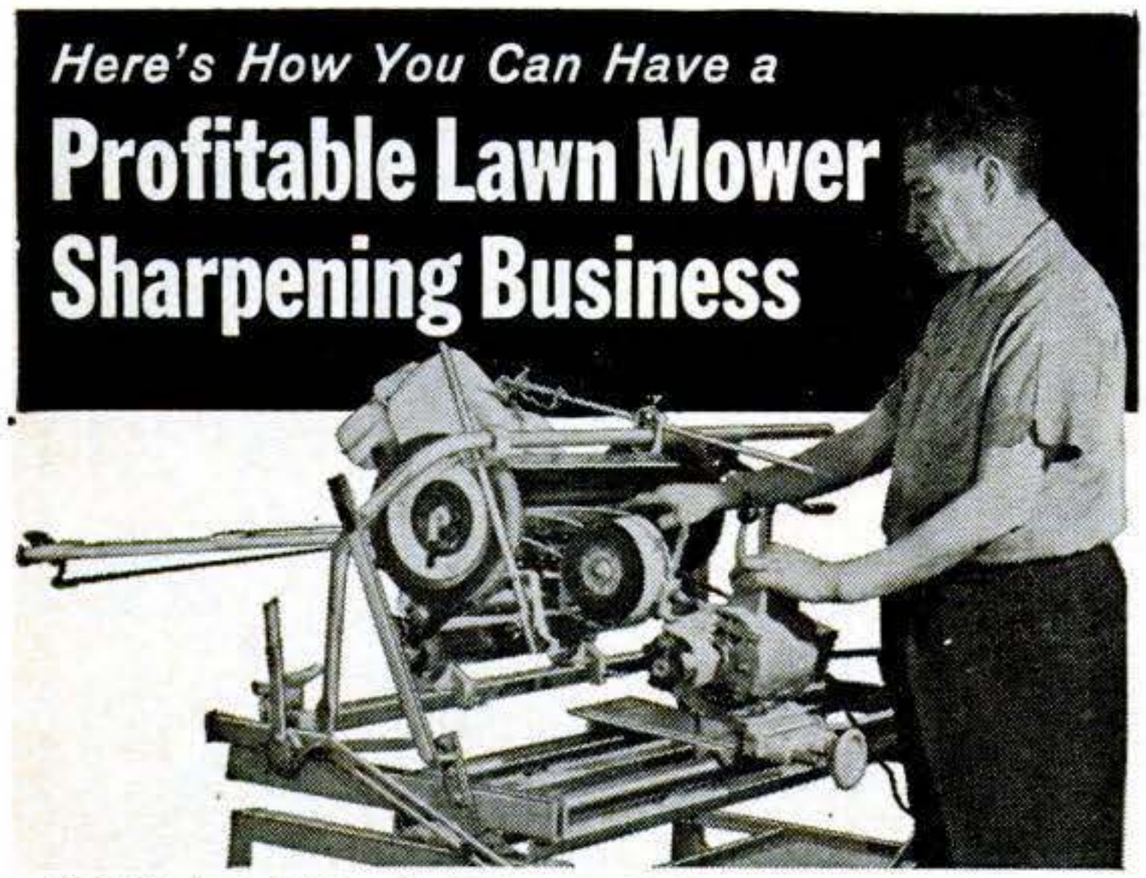
SEND FOR YOUR FREE CATALOG

20 pages of full-color illustrations of all the Kirsten models up to $18.50

KIRSTEN PIPE CO., Inc.
Dept. PS-2
P.O. Box 5227
Seattle, Wash. 98107

Here's How You Can Have a

Profitable Lawn Mower Sharpening Business



EARN $5 AN HOUR!

Earn extra cash right from the start—average $5 an hour. The Foley Lawn Mower Sharpener is a complete shop in one machine. No experience is needed to start—anyone can operate it, and turn out professional-like jobs. All operations are done quickly, easily and accurately.

Operate in Sparetime, in Your Own Home

An ideal sparetime business—although many find it so profitable, they devote full time to it. For complete fact-filled booklet, send coupon. No salesman will call:

Foley Mfg. Co. 208-6 Foley Bldg., Mpls., Minn. 55418
Send booklet on Lawn Mower Sharpening business.

Name_____

Address_____

City_____ State_____ Zip Code_____

BARGAIN FROM LONDON

Battle of Britain Set

Plus **103 Diff. BRITISH COLONIALS**

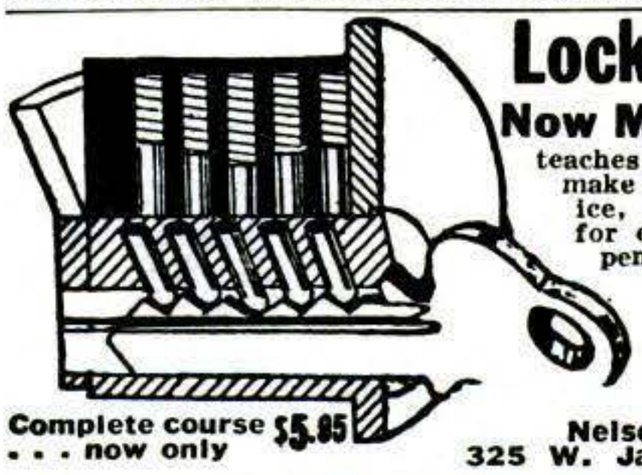
Historic 25th Anniversary set of 6 provocative designs commemorate 1940 Battle of Britain! Action scenes of Spitfires and Nazi raiders! You also get giant parcel of 103 diff. British Colonials, including **Rhodesia** Golden Jubilee, **Tonga** Coat of Arms, **Tristan da Cunha** Map, many others. All yours for just 24¢—bargain export price to introduce overseas approvals.

FREE if you act now! 125-year-old Queen Victoria penny red imperforate. Third stamp ever issued!

IMPORT DIRECT. SAVE 20-60%. Buy direct —where dealers buy. Exciting selections, low prices the easy 14 day approval way.

SEND 24¢ IN UNUSED U.S. STAMPS (NO COINS). ASK FOR LOT XA-6

BROADWAY APPROVALS, LTD., 50 Denmark Hill, London S.E. 5, England.

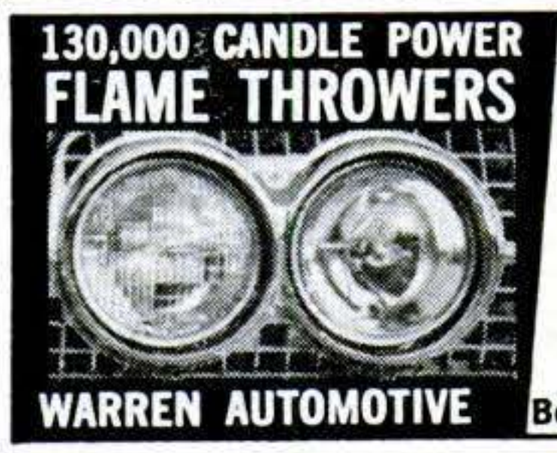


Locksmithing AND KEY MAKING

Now Made Easy! Practical up-to-date course teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lessons for every handyman, homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith, 53 easy illustrated lessons. Full price only $5.95, postpaid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course $5.95 . . . now only

Nelson-Hall Co., Dept. BV-1
325 W. Jackson Blvd., Chicago 6, Ill.



Fits all 4 light systems—bright sockets. American made for American cars. 65,000 candle power in each sealed beam unit. Over 2½ times as bright as the factory stock brights. Lets you really see where you are going. **$9.95 pair**

Prepaid U.S.A. No C.O.D. please

Box 563 Skokie, Illinois 60076

ENROLL—EARN YOUR DEGREE

of Bachelor of Bible Philosophy (B.Ph.B.), Master of Bible Philosophy (M.Ph.B.), Graduate of Bible Philosophy (G.Ph.B.), Doctor of Metaphysics (Ms.D.), or Doctor of Divinity (D.D.). Chartered by State, Correspondence Courses only. Please write for FREE BOOKLET.

AMERICAN BIBLE INSTITUTE
Dept. SP, 408A W. 75th St., Kansas City, Mo. 64114

FREE

MUSCLE BUILDING INFORMATION

Sensational New Isometrics
Less Time—Less Effort—Better results

BODY-TONE, Box 638-E, North Miami, Fla. 33161

Art LESSONS—$6 a month

Study Art for pleasure and profit. Learn Drawing, Painting, Advertising Art at home in spare time for only $6 a month. Assignments corrected with overlays and returned to you by mail. Est. 1914. Write for FREE BOOK. No salesman will call. **WASHINGTON SCHOOL OF ART, Studio 152, Port Washington, L.I., New York 11050.** Accredited, National Home Study Council. *Tear out as reminder.*

Copyrighted material

BIG BASS HANG OUT IN WEEDS

New Frog gets Big Bass & Pike where they hide and feed! Wiggles thru weeds, moss, stumps, lily pads where ordinary lures can't go. A soft, hollow-plastic body guards needle-sharp double hooks. *It can't snag or pick up moss!* When a fish bites, it *squeezes* the lure and hooks itself! You get more strikes . . . hook more BIG ONES than ever before. Live-frog action! Soft, natural feel. *Fish can't spit it out.* Perfect for nite fishing. Spin or Cast sizes in Black, Green, Brown or Purple. Also Wiggler, Popper, Soft Craw & Jig Styles, $1.00 ppd. Set of any 6 for $5.00. Order by mail—*100% satisfaction guaranteed.*

Snagproof Co., 4153(F) E. Galbraith, Cincinnati 36, Ohio

FAMILY ARMS

genuinely emblazoned from old records filed under 100,000 British & European surnames. In relief and full colour on immaculate **OAK WALL SHIELDS** for mural decoration.

7" x 6" ..... **$ 9.00**
12" x 10" **$20.00**
14" x 12" **$25.00**
22" x 18" **$40.00**

postpaid. Your check is returned if the Arms cannot be traced. School, Ship, Regimental Shields, Trade Marks, etc., similarly reproduced. ***Write Britain direct.***

YORK INSIGNIA LTD., YORK, ENGLAND

Renew it with
COLORCRETE

YOU CAN MAKE GOOD MONEY re-surfacing stucco, concrete, other masonry with Colorcrete. Easy to apply with spray-gun, becomes a permanent part of the masonry. Wide choice of colors. Write for free Colorcrete Opportunity Book.

W. E. DUNN MFG., CO., 572 Ottawa Ave., Holland, Mich.

"$8,500 PROFIT MY FIRST YEAR WITH INLAND 3-IN-1 RADIATOR SHOP"
—John Burrus, Sr., Fredericksburg, Va.

NEW!

Inland shop owners make good money testing, cleaning, repairing auto-truck-tractor radiators. You can too! Compact shop only 11'7"x3'6". Inland, world's largest radiator equip. mfr., **trains you free** in 2 weeks or less. Pay-As-You-Profit purchase plan. Proved merchandising assures volume. **Write for FREE BOOK,** owner letters. details on Inland's complete program. Profitable dept. for garage or gas station.

FREE! 42-page booklet **"Make Money Repairing Radiators"** shows equip., prices, owner letters—complete program.

INLAND MFG. CO., Dept. PS2
1108 Jackson Street, Omaha, Nebr. 68102
Send free 42-page booklet and money-making plan.
Print
Name _____
Address _____
City _____ State _____

ASSEMBLE YOUR OWN ALL-TRANSISTOR *Schober* ELECTRONIC ORGAN

3 NEW MODELS

Recital	$1500
Consolette II	$850
Spinet	$550

This is the new, all-transistor Schober Consolette II...the most luxurious "home-size" organ available today. Full 61-note manuals, 17 pedals, 22 stops and coupler, 3 pitch registers, and authentic theatre voicing leave little to be desired. Comparable to ready-built organs selling from $1800 to $2500.

The pride and satisfaction of building one of these most pipe-like of electronic organs can now be yours...starting for as low as $550. The Schober Spinet, only 38 inches wide, fits into the smallest living room. The all-new, all-transistor Schober Recital Model actually sounds like a fine pipe organ; its 32 voices, 6 couplers, 5 pitch registers delight professional musicians...making learning easy for beginners.

AND YOU SAVE 50% OR MORE BECAUSE YOU'RE BUYING DIRECTLY FROM THE MANUFACTURER AND PAYING ONLY FOR THE PARTS, NOT COSTLY LABOR.

It's easy to assemble a Schober Organ. No special skills or experience needed. No technical or musical knowledge either. Everything you need is furnished, including the know-how. You supply only simple hand tools and the time.

You can buy the organ section by section...so you needn't spend the whole amount at once.
You can begin playing in an hour, even if you've never played before—with the ingenious Pointer System, available from Schober.

Thousands of men and women—teen-agers, too—have already assembled Schober Organs. We're proud to say that many who could afford to buy *any* organ have chosen Schober because they preferred it musically.

Send for our free 1966 Schober Catalog, describing in detail the exciting Schober Organs and optional accessories; it includes a free 7-inch "sampler" record so you can hear before you buy.

THE *Schober Organ* CORPORATION
43 West 61st Street, New York, N. Y. 10023
Also available in Canada, Australia, Hong Kong, Mexico, Puerto Rico, and the United Kingdom

THE SCHOBER ORGAN CORP., DEPT. PS-23
43 West 61st Street, New York, N. Y. 10023

☐ Please send me FREE 1966 Schober Catalog and FREE 7-inch "sampler" record.

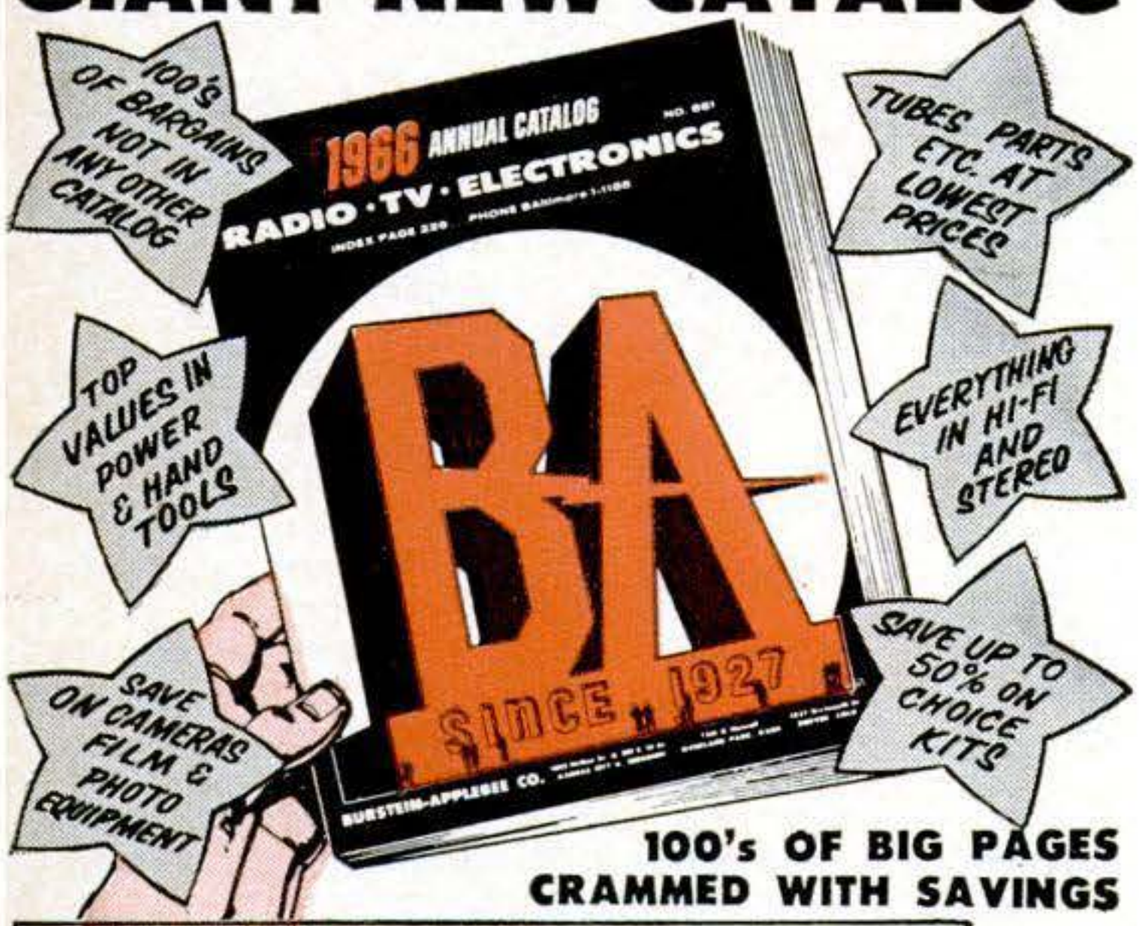
☐ Enclosed find $2.00 for 10-inch quality LP record of Schober Organ music. ($2.00 refunded with purchase of first kit.)

Name _____
Address _____
City _____ State _____ Zip No. _____

Copyrighted material

FREE

GIANT NEW CATALOG



100's OF BIG PAGES CRAMMED WITH SAVINGS

BURSTEIN-APPLEBEE CO.

Dept. PS, 1012 McGee, Kansas City, Mo. 64106

☐ Rush me FREE 1966 B-A Catalog.

SEND FOR IT TODAY

Name .....

Address .....

City ..... State .....

Please be sure to show your Zip No. .....

FREE

KAYOT Vista

The houseboat built for John Doe, Esquire

We had in mind the man with an average budget and a better-than-average eye for quality. We came up with a 4-sleeper including a complete galley, dinette and a private head that sells for hundreds of dollars less than anything comparable on the market. Interested? Get the facts.

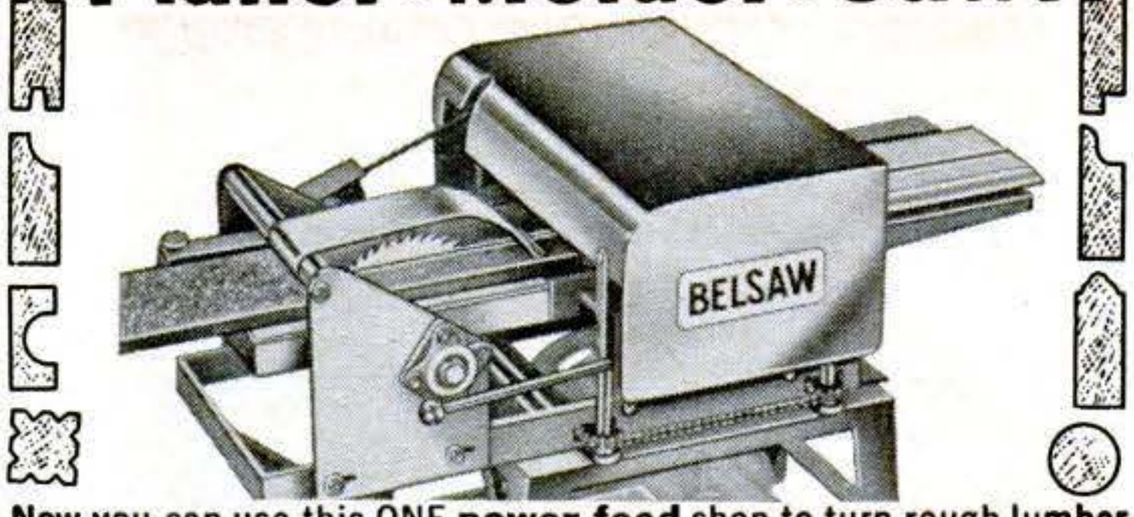
Write for FREE color catalog on the 1966 Kayots

M. J. Christopherson, Information Director

KAYOT, INC.

Mankato, Minnesota

Planer•Molder•Saw!



Now you can use this ONE **power-feed** shop to turn rough lumber into moldings, trim, flooring, furniture . . . ALL popular patterns. RIP . . . PLANE . . . MOLD . . . separately or all at once with a one HP motor. Use 3 to 5 HP for high speed output. Low Cost . . . You can own this power tool for only **$30.00** down payment.

Send postcard today for complete facts.

BELSAW POWER TOOLS, 926 Field Bldg., Kansas City 11, Missouri

PLAY GUITAR IN 7 DAYS

OR MONEY BACK

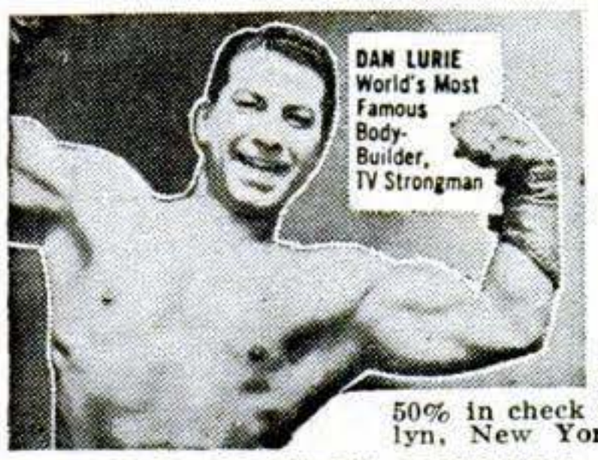
TOP GUITARIST ED SALE'S famous 66 page secret system worth $3.00 teaches you to play a beautiful song the first day and any song by ear or note in seven days! Contains 52 photos, 87 finger placing charts, etc. plus 110 popular and western songs, (words and music); a $1.00 Chord Finder of all the chords used in popular music; and a $3.00 Guitarist Book of Knowledge.

TOTAL VALUE $7.00 —ALL FOR ONLY $2.98

SEND NO MONEY! Just your name and address, pay postman: $2.98 plus C.O.D. postage. Or send $3.00 with order and I pay postage. (Sorry, no C.O.D outside Continental U.S.A.—please remit with order).

10-Day Money-Back Guarantee.

ED SALE, Studio 154-B AVON BY THE SEA, N. J.



GUARANTEED FASTEST WAY to he-man strength! Famous DAN LURIE BARBELLS

SEND FOR FREE GIANT CATALOG

Factory Prices	Cast Iron	Semi-Steel
50 lb. Set	$9.48	$10.48
100 lb. Set	15.98	18.98
150 lb. Set	23.48	27.48
Extra Wts.	16c lb.	18c lb.

$9.48 Plus **Free** $10 Course

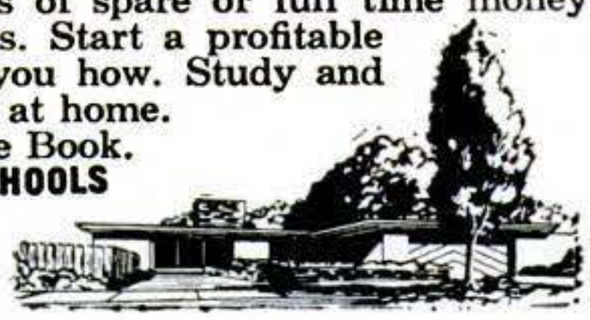
MONEY BACK GUARANTEE—Send 50% in check or money order F.O.B. Plant Brooklyn, New York. Balance C.O.D.

DAN LURIE BARBELL CO., 1661 S-2 Utica Ave., Dept. 670B, Brooklyn 34, N.Y.

BE A LANDSCAPE CONTRACTOR

LEARN MODERN LANDSCAPING for exciting hobby or profit. Thousands of spare or full time money making opportunities. Start a profitable business—we show you how. Study and earn your certificate at home. Write today for Free Book.

LIFETIME CAREER SCHOOLS
Dept. PS-26
11826 San Vicente Blvd.
Los Angeles, Calif. 90049



HOME-IMPORT BUSINESS–*Make Big Profits*

TAPE RECORDER $6.70 Complete Outfit

New Drop Ship Plan offers you first day profits! Deal direct with overseas sources at prices shown. Dazzling bargains with no investment. Full or spare time. Rush coupon today for FREE Book!

MELLINGER, Dept. X-242, 1554 So. Sepulveda, Los Angeles 25, California
Mail FREE Book, "How to Import and Export" and details Free.

NAME .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

Copyrighted material

GROSSED $1101.35 IN 4 WEEKS

Some make more — some less...

Many men have discovered how to be independent, to be free of layoffs and bosses. L. S. Mason grossed $1101.35 in 4 weeks. T. N. Cochy averaged $806 per month 12 months. H. Lemon says, "I netted $133 in one 8-hour day." A father-son combination grossed $44,000 their second year.

How much you earn depends largely on you, but we help you to start and work with you for your success. Training and consulting with experts is available at no additional cost. You need no special skill, no large investment. Start part-time if you wish. Hire helpers as needed.

NO SHOP NECESSARY • Our **PORTABLE ELECTRIC DETERGER** shampoos rugs, carpets right on customer's floor. Wonderful results bring you repeat business, large fees. So efficient and safe, it is used by largest hotels and railroads.

• • •

OURS IS NOT A LEASE ARRANGEMENT

You are free to operate independently. You sign no contract. You own the deterger outright and are your own boss...every dollar you take in is yours to keep. You pay no fees, or dues, or royalties, and enough supplies come with it to return far more than your investment. Many earn the cost of the deterger in a week or two. It costs nothing to get the details ...write **TODAY.**

MAIL COUPON TODAY FOR FREE BOOK

VON SCHRADER MFG. CO., • 211-R Pl., Racine, Wis.

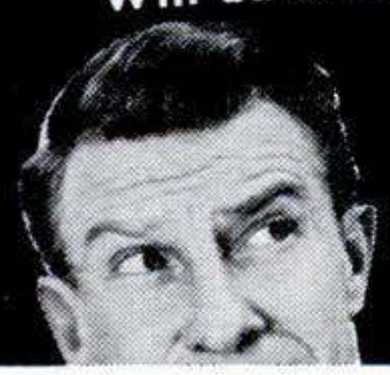
Without obligation send me **FREE** booklet about your **RUG DETERGER** and tell me how I can start my own permanent, profitable business.

Name_____

Address_____

City_____ State_____ Zip Code_____

What if I'm laid off?
Will automation take my job?
How can I ever afford to retire?
Am I too old to change jobs?
Can I learn a new skill?
Could I succeed as my own boss?
How can I earn extra money fast?
Will my job ever pay more?



$250 EARNED WHILE TRAINING PAYS FOR COURSE AND EXTRA EQUIPMENT FOR HIS OWN SHOP

"I wanted another occupation to help me in my part time business of speedometer repair. While taking the course I was able to earn enough to pay for the course and extra tools, books and key blanks besides for the full time shop I intend to open soon."

Jacob A. King,
Hereford, Texas.

Be a SKILLED LOCKSMITH

...and Solve ALL Your "FUTURE" Problems

MAIL COUPON NOW

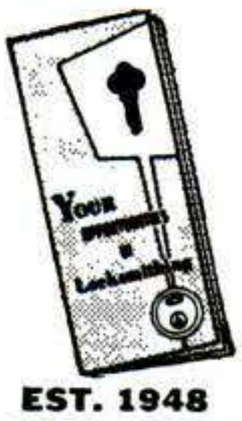
...with Locksmithing YOU HAVE IT MADE! You'll do light, clean, fascinating work—take your choice of steady, high-pay jobs or a big-profit spare-time or full-time business with your own "built-in" pension plan. EARN MORE—LIVE BETTER, say "goodbye" to layoffs, automation, slack times, forced retirement!

LOCKSMITHING IS SO EASY TO LEARN—EARN Extra Money FAST.

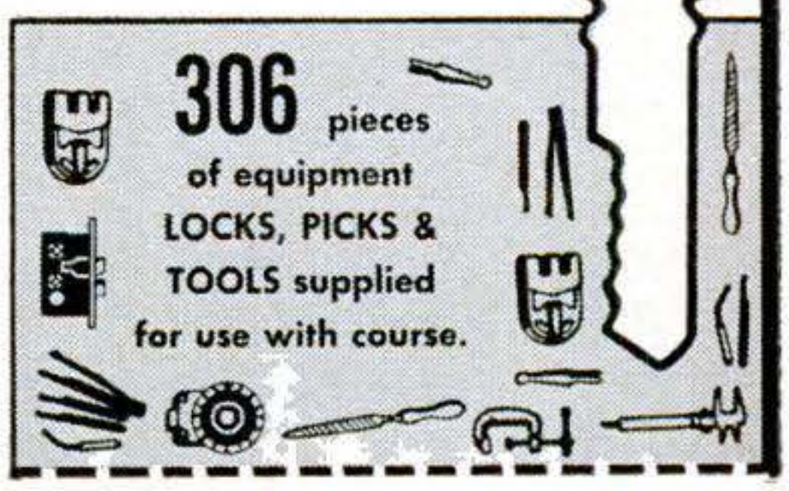
Regardless of age, education, minor physical handicaps, fun and earnings begin AT ONCE. CASH IN on all kinds of locksmithing jobs AT HOME. It's quick and easy! Experts guide you—ALL locks, keys, parts, picks, special tools and equipment, complete illustrated lessons supplied.

FREE illustrated Book, FREE Sample Lesson Pages. MAIL COUPON NOW! Find out how being a skilled Locksmith can help you earn more, enjoy a better life. End your worries—Write TODAY. No salesman will call. Only school of its kind: N.J. State Lic. Accredited member National Home Study Council.

LOCKSMITHING INSTITUTE, Div. Technical Home Study Schools
Dept. 111-026, Little Falls, N.J. 07424



EST. 1948



Locksmithing Institute, Dept. 111-026
Little Falls, New Jersey 07424

Please send FREE Illustrated Book—"Your Big Opportunities in Locksmithing," complete Equipment folder and sample lesson pages—FREE of all obligation—(no salesman will call).

Name.....
(Please Print)

Address.....

City.....State.....Zip.....

Copyrighted material

ARROW T-50®
ALL PURPOSE
STAPLE GUN

SHOOTS A STAPLE WHEREVER YOU'D DRIVE A NAIL!

FASTER! CHEAPER! BETTER!

for 1001 Home Improvement Fastening Jobs: Ceiling Tile, Insulating, Upholstering, Screening, etc.

Available at hardware, lumber, building supply, stationery and other retail outlets.

ARROW FASTENER CO., INC.
One Junius Street • Brooklyn 12, N. Y.

Earn HIGH WAGES as a HEAVY EQUIPMENT OPERATOR

. . . and years of future security in the multi-billion dollar construction industry, in this country and *overseas!* Learn how at National, the original school of heavy equipment operation. For men ages 17 to 56. National is NOT a correspondence school. You train on school-owned diesel-engined machines at National's huge proving ground in North Carolina. Full 220 and 440 hour courses. Full-time Job Advisory and Counselling Director for the exclusive benefit of graduates. VA approved. Payment plan available. Write TODAY for FREE catalog. National School is a Member of American Road Builders Association Service and Supply Division.

Since National School was founded 11 years ago, students from all 50 states and 28 foreign countries have been enrolled. Hundreds of graduates are now working in construction for higher wages than they ever made before.

Ask about our Train Now—Pay Later Plan!

NATIONAL SCHOOL OF HEAVY EQUIPMENT OPERATION Dept. A-70
P. O. Drawer 1686, Charlotte, N. C.

Please send me FREE illustrated school catalog and complete information. I understand there's no obligation.

Name.....Age.....
Address.....Phone No.....
City.....Zone.....State.....

109 Stamps for only 10¢ featuring MAN IN OUTER SPACE

Yes, only 10¢ brings you this fascinating collection of 109 different stamps from all over the world. Includes unique issues showing U.S. space heroes, Russian "twins," "walk-in-space," Congo "rockets," many more. You also get Midget Encyclopedia of Stamp Collecting, plus a selection of other fine stamps on approval for free examination. Buy only those you want—or none at all—return balance within 10 days. Satisfaction guaranteed.

Rush 10¢ today. Ask for Lot EH-58

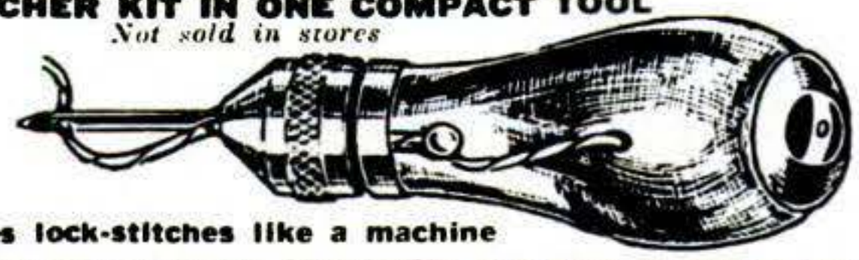
ZENITH, 81 Willoughby St., B'klyn, N.Y. 11201

SEW LEATHER AND TOUGH MATERIALS EASILY

COMPLETE, EASY-TO-USE, HEAVY DUTY STITCHER KIT IN ONE COMPACT TOOL

Not sold in stores

$1.98 Postpaid



Makes lock-stitches like a machine

SAVE MONEY with HEAVY-DUTY STITCHER. It's easy to sew or repair anything made of Leather, Canvas, Nylon, Plastic, or other heavy materials. Quick "push pull" action makes firm, even lock-stitches like a machine. Gets into hard-to-get-at places. Just the tool needed for repairing Luggage, Footwear, Convertible Tops, Awnings, Seat Covers, Sportsgear, Rugs, Saddlery, etc. Comes complete with 3 different needles (fine, heavy, curved) and bobbin of strong waxed thread (10 yds) all self-contained in HEAVY-DUTY STITCHER. Easy-to-follow directions included. Extra needles and thread always available. Send $1.98 money order or check, and we pay postage. If C.O.D. $1.98 plus postal charges. Money back Guarantee. Sportsman's Post, Lake Ave. Ext., Dept. M-58, Danbury, Conn.

LEARN TO BE A DENTAL MECHANIC

SECURITY • PRESTIGE • GOOD PAY

Learn at home, in your spare time, to make Crowns, Plates, Bridgework, etc. Dental Mechanics are employed by Dentists, Dental Laboratories or open your own shop, full or spare time. FULL EQUIPMENT OF TOOLS AND MATERIALS INCLUDED WITH COURSE. Low tuition. Easy Terms. Write for FREE BOOK about this money-making profession that's not affected by automation.

McCARRIE SCHOOL OF MECHANICAL DENTISTRY
127 So. 13th Street, Dept. 89, Philadelphia 7, Pa.

RUPTURE!

An amazing Air-Cushion Invention allows body freedom at work or play. Light, neat, cool, sanitary. Durable, cheap. Day and night protection helps Nature support weakened muscles gently but surely. No risk. Sent on Trial! Write NOW for free Booklet and Proof of Results. All correspondence confidential.

Brooks Company, 348-C State St., Marshall, Mich.

PELLET FIRING
LUGER AUTOMATIC

- **MAGAZINE LOADING CLIP**
- **OVER 15 MOVING PARTS**
- **FULLY AUTOMATIC**

ONLY $1.98

Automatic full size model of a Luger Automatic pistol —contains over 15 moving parts. Loads 8 complete rounds which snap in to the hard butt simulating a Luger. Fires 8 bullet shaped pellets. Has automatic slide action.

MOST AUTHENTIC MODEL GUN WE'VE EVER SEEN

Comes to you with working parts disassembled with cleverly engineered springs, full instructions, supply of pellets and targets. **Full Money Back Guarantee.** Simply send $1.98 plus 27¢ shipping charge. NY State residents please add 4¢ sales tax. From:

HONOR HOUSE PROD. CORP., Dept. 97LG14, Lynbrook, N.Y.

NEW ELECTRONIC ACCELEROMETER

Measures Your Car's Acceleration
Calibrated 0-20 Ft/Sec/Sec
Extremely Accurate and Informative

Wonder how much effect those speed accessories, tuning, different fuels have? When to shift? Know with your own private dynamometer. (Force = Mass × Acceleration) 3½ inch, high quality D'Arsonval movement accurately registers acceleration information from precision transducer. Illuminated scale, chrome meter & case. 12V neg. gnd. 5-minute installation. Satisfaction guaranteed. $34.95 ppd. Wash. residents add $1.47 sales tax.

LEIBERT ENTERPRISES
Dept. B, P. O. Box 461 Yakima, Wash. 98901

BUSINESS OPPORTUNITY

Leading camping trailer mfr. seeks qualified dealers. Find out how you can profit from one of the fastest growing retail business opportunities in America. Minimum investment.

WRITE FOR DEALER INFORMATION

REGIS-TRIMLINE, Inc.
13300 Wall St., Dept. P2
Elm Grove, Wis. 53122

VACUUM MOLD AT HOME!!

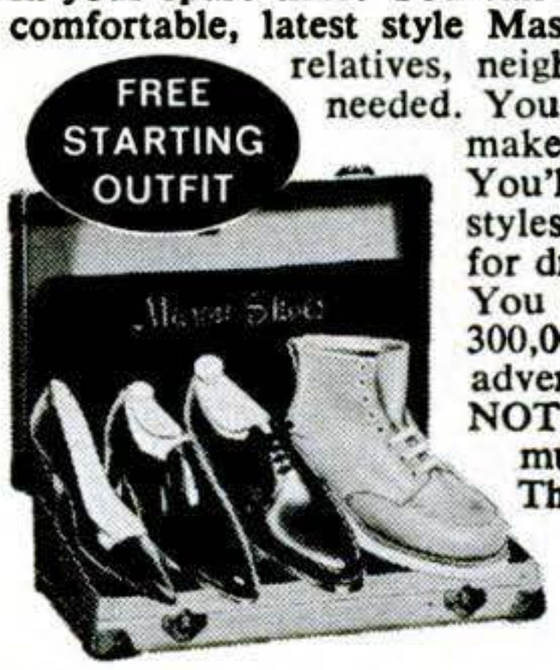
WE SEND YOU AN ACTUAL FREE SAMPLE

Big Profit! Making gold, silver, bronze, all rainbow colors and clear 3-D molded plastic products at home. New instruction shows you how! Includes **FREE** materials and unique **FREE** single-cavity vacuum molder! You actually make beautifully detailed mold of anything in an evening. Start your own business in spare time. Grow big! There's a lot more — Find out! **FREE Fact Pack.** Write:
Nationwide Plastics Box 23321-NV Los Angeles, Calif. 90023

MAKE UP TO $100 A WEEK

IN YOUR SPARE TIME WEARING
SHOES *WE GIVE YOU!*

Imagine getting high fashion shoes without cost—and making yourself an easy $5 to $10 in an hour in your spare time! You can do it just by showing comfortable, latest style Mason Shoes to friends, relatives, neighbors. No experience needed. You start to take orders, make money, right away. You'll offer 275 different styles for men and women for dress, work and sports. You draw on our stock of 300,000 pairs. Nationally advertised Mason shoes are NOT sold in stores. Folks must buy from YOU! That means automatic repeat and referral business. Mail coupon today!



FREE! EVERYTHING YOU NEED! We send you everything you need to start a successful spare time business. No investment, no inventory, no overhead. You keep 100% of your profits. Mail coupon today and we'll rush you a FREE Starting Outfit with everything you need to start making big money right away. No obligation. Mail coupon now.

Rush Coupon for Your FREE OUTFIT

The Mason Shoe Mfg. Co. Dept. G-206
Chippewa Falls, Wisconsin

Please rush FREE and postpaid everything I need to start making money the very first spare hour in my own "Shoe Store Business" I can run from my home.

print
Name_____

Address_____

Town_____ State_____ Zip_____
(If Known)

LEARN MEAT CUTTING AT NATIONAL

Pay After Graduation

The steady dependable trade of Meat Cutting taught easily in 8 short weeks. YOU LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a profitable store of your own. Remember PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established 43 years. Get National training NOW. Pay your tuition in easy weekly payments after you graduate. Send coupon for FREE school catalog—TODAY. G.I. approved.

National School of Meat Cutting, Inc.
Dept. 51-D, Toledo, Ohio 43604

Send me your FREE school catalog on National Training at Toledo in Meat Cutting, Meat Merchandising and Self Service Meats. No obligation. No salesman will call.

Name.....Age.....

Address.....

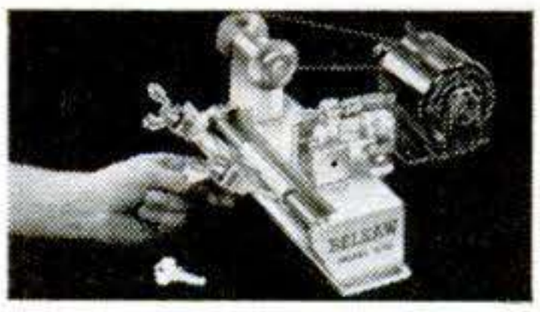
City.....State.....

Approved for Veterans

Copyrighted material

FREE Key Machine

Kind master locksmiths use. Sells for $125, but yours FREE with Locksmithing Course



You Can Learn To Be A LOCKSMITH in your spare time

There's a big demand for skilled locksmiths. You can earn big money either full or part-time in your own home. Be your own boss; earn steady, year 'round income with no layoffs. The BELSAW INSTITUTE training, recommended by professional locksmiths, teaches you to make keys, open and repair locks on homes, cars and buildings. Easy, step-by-step illustrated lessons complete with all tools and supplies. We tell you how to get servicing jobs, how much to charge, how to earn while you learn and how to build a secure cash profit business.

Mail Coupon for FREE Book Today!

BELSAW INSTITUTE, 116H Field Bldg., Kansas City 11, Mo.
Send FREE book, "Keys To Your Future!"
No obligation. No salesman.

Name.....

Address.....

City.....*State*.....

Big Profits in UPHOLSTERY Get Your Share...FAST!

EARN BIG MONEY 3 NEW EASY WAYS

FREE Deluxe Illustrated Book and **FREE** Sample Lesson Pages Give Proof — Show How

1. Be your own boss, make up to 85% profit on every job.
2. Start earning right away while learning at home in sparetime — keep furniture you build, or sell for hundreds of dollars.
3. Today's home and office upholstery, re-upholstery, slipcover boom make it easy to say "goodbye" to layoffs and take your pick of steady big-pay jobs.

LEARNING EASY AS A B C

Your own two hands are all you need. UTS experts and simple instructions do the rest. You get all tools, new wooden frames, materials, fabrics, business tips, wholesale privileges, decorating magic **at no extra charge whatsoever!** LEARN FAST, EARN FAST. Thousands we've trained now doing it. Find out how you can, too.

Tools-Equip. To Keep or SELL

MAIL COUPON TODAY!

UPHOLSTERY TRADES SCHOOL, Dept. 511-026, Established **1939**
(Division of Technical Home Study Schools)
Little Falls, New Jersey
Please send me FREE book, "Your New Way to a Successful Career," and FREE sample lesson sheets. No obligation — no salesman will call.
Name .....
(Please Print Plainly)
Address .....
City .....Zone.....State.....

IF YOU HAVE RUPTURE

Get this *NEW FREE BOOK*

Tells how Rupture can be treated by a mild Non-Surgical method that is backed by a Life Time Certificate of Assurance. This treatment method has a long history of use and is recognized by Authorities today. Men and Women from all over the country have taken the Non-Surgical Treatment and reported it is effective. Why put up with wearing a griping, chafing, unsanitary truss?

Write today for this FREE BOOK. Tells How, explains Why more and more Rupture Sufferers are using Modern Non-Surgical Treatment Methods. Act Now. No Obligation.

EXCELSIOR MEDICAL CLINIC
Dept. E6231 **Excelsior Springs, Mo.**

NO JOB WORRIES

PLASTEX INDUSTRY needs manufacturers on small scale for big production of Lamps, Clock Stands, Art Goods, Novelties in Plastic Marble imitation. No experience necessary. ½¢ material makes regular 10¢ store sellers. Moulds furnished for fast production. Small investment brings good profit. Big wholesale orders now being placed. Ambitious men have chance for real prosperity and job security. Our NEW FREE booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N.Y.

VANISHING KEY!

Only 50¢

Now you see it—now you don't! Hold it up and P-O-O-F — it's gone! Vanishes faster than a woman can change her mind. Clever and astonishing. Comes complete with easy directions for 4 amazing tricks! You can do it! Lots of fun! Mystify others! Be the Life of the Party! Send check, cash, money order.

FREE WITH EACH ORDER YOU GET OUR WORLD-FAMOUS CATALOG — 160 Pages of 1000 Exciting Tricks.

House of 1000 Mysteries • Dept. PS26 • 4018 N.E. Fifth Ave., Ft. Lauderdale, Florida

PAGE FOR TILLING PLOWING MOWING

A FULL LINE — 10 and 12 HP
with complete gear drive and reverse
FREE CATALOG • LOW PRICES • EASY TERMS
Over 40 years experience
OVER 60 ATTACHMENTS AVAILABLE!

PAGE Richfield 16 Wisconsin

DEALERS WANTED

PREPARE FOR A WONDERFUL WELL PAYING PRESTIGE CAREER AS A JEWELER

Jewelers from coast to coast need trained men and women to buy, sell, grade and appraise beautiful merchandise—diamonds, emeralds, pearls, rubies, other gems. Our easy-to-understand home-study course prepares you for a well paying prestige career with a wonderful future as a professional jeweler. Profit from the growing demand for diamonds. More than 14,000 jewelers have studied through GIA—training headquarters of the jewelry industry. Write today for complete details; you'll also receive free full-color illustrations of beautiful gems.

GIA Gemological Institute of America Dept. PS-26
11940 San Vicente Blvd., Los Angeles, Calif. 90049

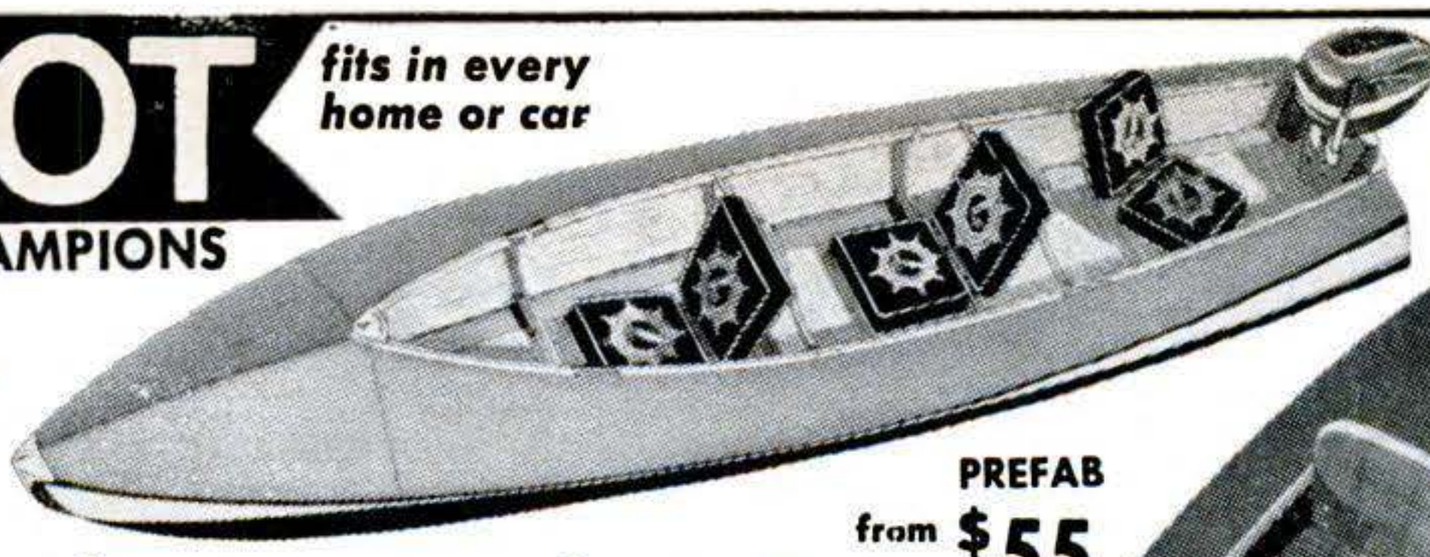
Copyrighted material

FOLBOT

fits in every home or car

CHOICE of CHAMPIONS

belongs to You



FACTORY BUILT $146

PREFAB from $55

Most inexpensive too

GENUINE Folbot RECREATION for just ONE small investment, WITHOUT the continuous burdens of complicated 'big rig' operation. You GO CAREFREE anytime with COMPACT Folbot . . . rocky streams, lakes, marsh, surf & open sea. Superior non-sinkable designs provide SAFEST low gravity center, balanced low & high seating, substantial construction, protective decks & EXCLUSIVE swivel-back COMFORT. ALL within your reach. In handy Folbot YOU GLIDE smoother, faster & NOISELESS with paddles, oars, or sails and ride softly w. 1 to 10 HP. motors. Many styles & sizes from 1 to 4 seaters, FOLDING or rigid PORTABLE come in PREFAB KIT, or expertly FACTORY BUILT

NOW at SPECIAL SAVINGS

YACHT-SMART large DACRON Sail Rig $99

NEW Fabulous 16 foot $119 Factory BUILT

Folding from $179 Factory finished

NATIONAL SAFETY RECORDS

WORLD RECORD FISHING

FREE ACTION CATALOG

Mail coupon or address

to: FOLBOT CORP. Dept. PS 266
Charleston, S. C. -29405

Name_____

Address_____

City_____ State_____

for YOUR SPORT & FAMILY FUN

SAVE $80

FREE LITERATURE

COMFY-KIT® 1707 E. Ohio Street Dept. PS
Dallas, Texas

AIR CONDITION YOUR OWN CAR

Easy. We supply everything you need: Kit, tools, illustrated step-by-step instructions. Just 5 hours to install. Made by leading auto air conditioning manufacturer. 12 month, 12,000 mile warranty. Our price to you just $149 (you save at least $80). Fits all U. S. cars. Send $1 for complete instructions, applicable against purchase price. Please state size of engine, make and year of car.

REAL ESTATE

BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your **own business quickly.** Men, Women, all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, & related subjects. **STUDY AT HOME** or in classrooms in leading cities. **DIPLOMA AWARDED. Write TODAY for FREE Booklet!** Accredited Member National Home Study Council. (Established 1936)

FREE BOOK TELLS HOW

WEAVER SCHOOL OF REAL ESTATE
3521-S Broadway Kansas City, Mo. 64111

Tiny "Sleeper" Pays Men $64,000 a Day

Rush Name for Money Facts FREE

A "Sleeper" is a little goldmine that not too many salesmen know about. The tiny Matchbook is one of the most spectacular "Sleepers" ever discovered by Salesmen. That's because it's one of the *biggest* and *fastest* sellers of all times. Businessmen give Salesmen orders for ONE BILLION Matchbooks *every day*. And for handling these orders the salesmen make a profit of $64,000—*every day*. If you have missed this amazing "Sleeper", make up for lost time. Get the money making Matchbook story now. A letter or postcard brings them to you free and postage prepaid. Write right now to me, Robert E. Oakes, Matchcorp of America, 3433 W. 48th Place, Dept. PS-26, Chicago, Illinois 60632.

ENGINEERING

HEALD

TRAINED ENGINEERS are holding High Paying Positions in Industry, State and Federal Government.

AMERICAN INDUSTRY NEEDS TRAINED ENGINEERS NOW

BACHELOR OF SCIENCE DEGREE, 30 MONTHS

SAVE 2 YEARS' TIME

B.S. Degree Courses:

- ☐ Electrical Engineering
- ☐ Electronic Engineering
- ☐ Mechanical Engineering
- ☐ Civil Engineering
- ☐ Architecture

Diploma Courses:

- ☐ Radio-Television Plus Color Technician
- ☐ Electronic Technician
- ☐ Architectural Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting

New Term Starts Quarterly

Write Today for Free Information.

HEALD'S ENGINEERING COLLEGE

Van Ness at Post, Dept. PS-266 San Francisco, California

NAME_____

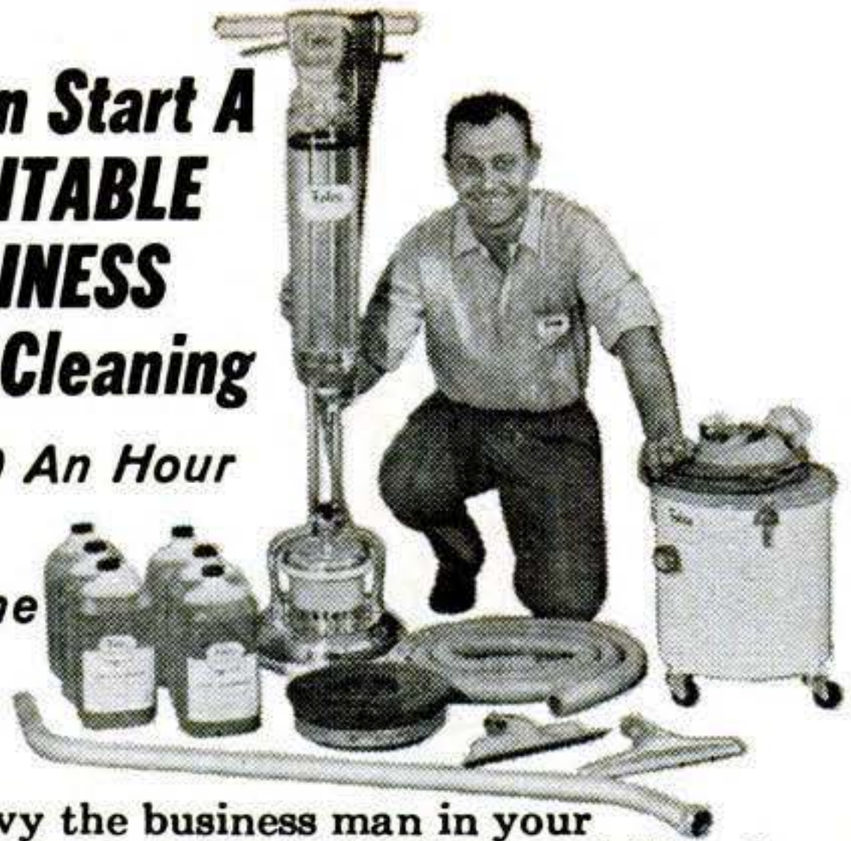
STREET_____

CITY_____ STATE_____

Copyrighted material

You Can Start A PROFITABLE BUSINESS In Rug Cleaning

Earn $10 An Hour In Your Sparetime



Don't envy the business man in your town who has a business of his own! You, too, can be that man. New lucrative Foley-Care rug and floor cleaning service available to aggressive men who lack capital. Minimum investment! You can start in sparetime while still on your present job.

FREE Booklet Tells You How...

The complete story is told in this interesting booklet, "A Business of Your Own". It reveals why a Rug Cleaning Service is so profitable, why it's in a growing demand, how you can get started at once and produce income in just a few days. Write today! No salesman will call!

FOLEY CARE, Dept. 203-6
3333 Fifth St. N. E., Minneapolis, Minn. 55418

Please send Free "Business of Your Own" Booklet on Rug Cleaning

Name_____

Address_____

City, State, Zip code_____

BOAT PLANS

FULL SIZE PATTERNS • FRAME KITS

OVER 60 sail, inboard and outboard designs . . . catamarans, houseboats, dragsters, hydros . . . "Glen L" has the most complete selection of build-it-yourself boats from an 8' dinghy to a 35' cabin cruiser. And, only "Glen L" includes written and pictorial step-by-step instructions and material listings specially prepared for amateurs with all Plans, Patterns and Frame Kits.

Send for new 80-page catalog completely illustrating the full selection of over 60 boats. MAIL 50¢ TO:

GLEN L—9152P Rosecrans, Bellflower, Calif.

KENNEDY *Gold Stamps*

Fantastic **New J.F. Kennedy** memorial local set of 3 **round gold** foil **coin**-shaped stamps from Sanda Island **plus** 48-page Stamp Dictionary—only 25¢!! Bargain approvals included.

STAMPEX CO., Box 47-KP **White Plains, N.Y.**

HYDRAULIC JACK REPAIRS

Earn While You Learn at Home

Earn while you learn at home. Trained and qualified mechanics needed NOW to service inoperative hydraulic jacks. BIG opportunity for ambitious men. We show you HOW—in your basement or garage, spare time cash income in an expanding industry. Don't wait, ACT NOW! Get the facts.

Write for folder No. PS2 and free bonus offer.

HYDRAULIC JACK REPAIR MANUAL CO.
P. O. BOX 50 • BLOOMFIELD, N.J.

SAVES PLUMBING REPAIR BILLS
FREE TRIAL OFFER

POWER GUN OPENS SEWER INSTANTLY

FREE BOOK ★ Tells How To Clean All Drains (Helpful Data)

THINK OF IT!

Presto, one shot of new **POWER GUN** removes Grease, Detergent, Roots in **Sinks, Urinals, Showers, Bathtubs, Toilets, Floor drains** ½" to 6" pipe 200 Ft. Amazing Reaction. Receive valuable advice on Drainage Problems. FREE SKETCH of Plumbing Pipeline in buildings. Start your own Business or save Plumbing Repair. Tear this Ad out now and write name and address beside it for **FREE BOOK.** No agent will call. (Chicago Phone Kildare 5-1702) **MILLER SEWER ROD, DEPT. PSF, 4642 N. CENTRAL AVE., CHICAGO, ILL. 60630**

KIDS!

Learn how you can buy used engines $15 up, new engines $30 with FREE confidential list and coupons when you order your plans

- **BUILD THIS MINI-BIKE!** Plans reveal step by step details!
- **BUILD A RACING KART!** Complete frame for less than $10!

RUSH $2 for plans (indicate type) or send 10¢ for brochure describing plans:
PLANS, Box 478, Dept. PS-2, Denver, Colo.

LAW FREE BOOK

THE LAW TRAINED MAN

Write today for a FREE copy of illustrated law book. "THE LAW-TRAINED MAN," which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for FREE law training book today.

Blackstone School of Law, 307 N. Michigan Ave
Founded 1890 ***Dept. 122, Chicago 1, Illinois***

GET INTO ELECTRONICS

V.T.I. training leads to success as technicians, field engineers, specialists in communications, guided missiles, computers, radar, automation. Basic & advanced courses. Engineering Technology and Electronic Technology curricula both available. Assoc. degree in 29 mos. B.S. obtainable. G.I. approved. Start Feb., Sept. Dorms, campus. H.S. graduate or equivalent. Catalog.

VALPARAISO TECHNICAL INSTITUTE
DEPARTMENT S, VALPARAISO, INDIANA

ENJOY FLYING YOUR OWN BENSEN

THE GYROCOPTER—EASY TO BUILD—SIMPLE, SAFE TO FLY

Acclaimed by novices and pros around the world. Lowest cost flying. Kits available, also building plans and flying instructions. Get 3-View Drawings, specs, photo for $3, or of Gyroglider $2.

BENSEN AIRCRAFT CORP., Dept. PS-26
Raleigh-Durham Airport, Raleigh, N. C. 27602

NAME_____

ADDRESS_____

Copyrighted material

MAGIC MAIL PLAN

that comes with this Little Machine

CAN MAKE YOU $12.00 AN HOUR

Write today for free facts about the newest and most fascinating of all new home operated businesses. For the first time, a simplified machine brings the fabulous profits of Plastic Sealing and Plastic Laminating within reach of the small operator. Anyone can learn to operate it with a few minutes practice. Then—with our MAGIC MAIL PLAN—can get mail orders pouring in daily with cash in every envelope.

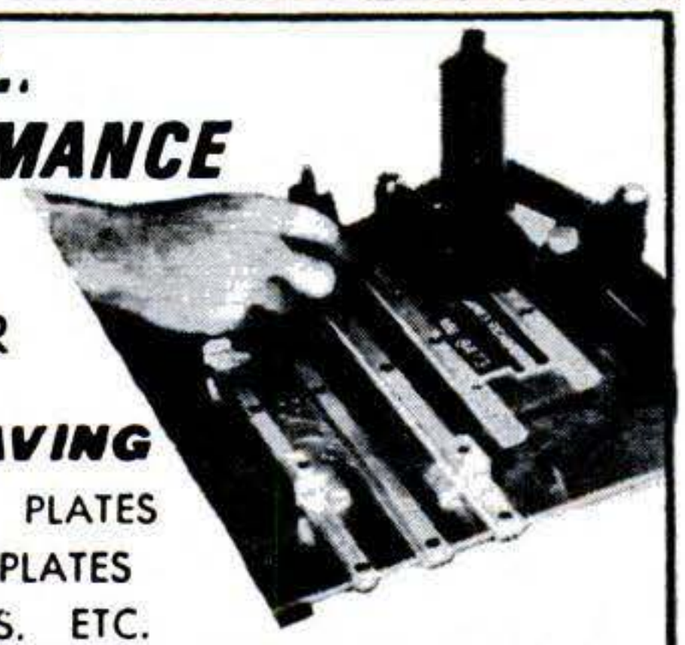
No Canvassing or Selling

Fill orders at home in spare time to start. Then expand to full time business. We even supply circulars to bring back cash and orders. Rush name for all the facts you need to start. A postcard will do. No charge.

WARNER ELECTRIC CO., Dept. L-3-BX
1512 Jarvis, Chicago, Ill. 60626

SMALL SIZE..
BIG PERFORMANCE

SM-100
TAG ENGRAVER



EARN BY ***ENGRAVING***
DOOR PLATES
DESK PLATES
BADGES. ETC.

SMD SCOTT MACHINE DEV. CORP.
215 PROSPECT AVENUE, PS8
WALTON, NEW YORK 13856

FREE CATALOG

MAKE YOUR OWN RODS AND LURES

Send for FREE Wholesale Catalog. The most complete and fully illustrated catalog of reels, rods, beads, spinners, jigs, lure bodies and parts, sinker molds, feathers, tools, hooks, rod blanks, rod parts, swivels, wire, etc.

FINNYSPORTS, 1266X Sports Building, Toledo, Ohio 43614

When Writing to Advertisers Please Mention Popular Science

"We're looking for people who like to draw"...

says NORMAN ROCKWELL, one of America's 12 Most Famous Artists. "Our accredited training has helped thousands become full-time or part-time artists." If you like to draw, you may have talent worth training. Find out with our scientific 12-page ART TALENT TEST. Thousands paid to take it. Now get it FREE along with school brochure. No obligation. Send name, address, age to:

FAMOUS ARTISTS SCHOOLS
DEPT. 7997, WESTPORT, CONN.

Fruit is for jelly
(and beginning pipesmen)

Revelation is for pipe smokers who're tired of sweet, syrupy blends. You get the rich *naturally* mellow flavor of five great tobaccos. It's a taste you can stick with all day long.

Revelation is for the experienced pipe smoker.

A product of Philip Morris Inc.

---

20 COURSE HOME STUDY PROGRAM

KARATE! JUDO

BOXING! MUSCLEBUILDING! YOGA! STRONGMAN STUNTS! STRENGTH & ENDURANCE! HANDBALANCING! ETC.

YOU GET **ALL** THESE! •20 illustrated KARATE blows •SAVATE foot fighting •Secret NERVE CENTER and ANATOMY charts •20 lethal JUDO throws •20 terrific STRONGMAN STUNTS •Complete MUSCLE-BUILDING program •Ancient YOGA secrets •HANDBALANCING stunts •Complete BOXING program •Secrets of ENDURANCE •TENSION-FLEX COURSE •FITNESS EXERCISES •KEEP FIT PROGRAM •K MAN DUMMY. No C.O.D.'s. Canadians 75c. You Get The LOT...

FOR ONLY 50¢

FREE K-MAN KARATE PRACTICE DUMMY

HOME GYM & EQUIPMENT PLANS
Build gym equipment: Vault Horse, Rowing Machine, Boxing Ring etc. Convert basement, garage to gym. ONLY 50c with courses. TOTAL $1.00.

OXFORD STUDIO, 146 Blake St. (PS7) Mattapan, Mass.

NAME (print) .....
Address .....
City .....State.....

50c PROGRAM
$1.00 with Gym

Copyrighted material

Detroit Report...

FRONT DRIVE CONTINUES TO GAIN. Clark Equipment Co. has been making a limited number of the Cortez front-drive mobile homes for a couple of years. Now Clark is branching out with a light bus, the Urbanite, using the same power train. The engine is a Dodge slant-six coupled to a four-speed Clark transaxle. Power steering and power brakes are standard. The Urbanite is intended for airport shuttle service and other high-density transit operations.

Will Chrysler build a Bronco? According to rumors, Chrysler wants a vehicle to cash in on the four-wheel-drive boom. The company has suitable engines, axles, suspension and steering systems in production for Valiants, Darts, Sportwagons, and D-100 trucks, but has no tooling capacity for a new utility body. However, current expansion plans will provide the needed capacity within 18 months.

Chrysler's new "safety car" will be revealed this month. One of the new features will be an inflatable seat backrest that varies support to suit individual requirements. It will also have a TV screen in the instrument panel tuned to a TV camera in the tail (instead of a rear-view mirror)—an idea that was first shown on the Buick Centurion dream car back in 1956.

Borg-Warner to build sports cars? A year ago, B-W's Marbon Division got involved with a small group of Detroit enthusiasts headed by Dann Deaver who had built a light fiberglass sports car with a rear engine. The car was called the Centaur Research Vehicle, and one model was powered by a single-overhead-cam Sunbeam engine; another used the 180-hp. turbocharged Corvair engine. Now the CRV is strictly a Borg-Warner baby, and Deaver heads B-W's newest branch: Centaur Engineering.

Indianapolis speed records will surely be broken again this year. Mario Andretti was out there testing tires for Firestone recently and set up the fastest lap ever run at Indy: a sizzling 162.4 m.p.h.

Rambler's share of the market is down from 6.4 percent in 1960 to 3.56 percent in 1965. American Motors executives pin their hopes on new springtime models and options to reverse this unhappy trend.

We may scrap six million cars ~~this year.~~ The industry has regarded auto junkyards with indifference so far, but now Ford is taking steps to consume a quarter-million junked cars a year. A $3.5-million fragmentizer plant will be built near Detroit as the first step in a joint project between Ford and Luria Bros., scrap specialists, of Cleveland.

Latest Cobra has a 427-cu.-in. Ford V-8 and all-coil independent suspension. According to Shelby American, it will go from 0 to 100 m.p.h. and *stop* in a fraction over 14 seconds. This Cobra has self-cooling disk brakes on all four wheels.

Fords are selling within 1½ percent of Chevy since the 1966 models came on the market. The Impala still sells much better than the Galaxie, but the Mustang more than makes up for the difference. Fairlanes and Chevelles are neck and neck (again, the GM car has a slight lead). The Falcon is well ahead of the Corvair, and the Chevy II is not even in the top 20.

Demand for Tempest's overhead-cam six is keeping Pontiac's engine plant on three shifts. Engine production is what's limiting total production. When a new engine factory is completed in the spring, Pontiac will be able to make a million cars a year. Since January 1st, 45 percent of all Pontiacs have been Tempests, a record high for the "small" Pontiac. Consumer demand is almost evenly divided between the hot four-barrel and the regular-gas one-barrel versions.

Stock engines will be allowed at Indy this year. Overhead-cam racing engines are restricted to 256-cu.-in. displacement, while stock-block engines will be admitted up to 305 cu. in. This move is expected to attract eight or 10 cars with stock engines and add technical interest to a race that for some years has been a plain Ford vs. Offy contest.

Jan P Norbye
Automotive Editor

Copyrighted material

Solid funpower!

New 'Jeep' V-6!

Nobody makes 'em like this one. It's solid all the way through—solid build, solid looks, solid performance. Choose hot new V-6 engine or world-famous 'Hurricane' 4. You really 'fly' down the highway with that 160 h.p. 'Jeep' V-6—that's why we call it the Flying 'Jeep' Universal. And snow, ice, rugged country just add to the fun. Take your pick: familiar "little guy" or jaunty 'Jeep' Tuxedo Park Mark IV. Both offer 81" or 101" wheelbases, choice of tops, new colors, even bucket seats. You've got to drive it to believe it. See your 'Jeep' dealer. Look him up in the Yellow Pages.

The Flying 'Jeep' Universal

with 4-wheel drive

KAISER Jeep CORPORATION
TOLEDO, OHIO

"We're glad to answer ticklish questions about our used cars.

"We're Chevy dealers."

Every Chevy dealer will tell you the same thing. He expects you to browse. And ask questions.

That's his way of doing business. It has helped to make Chevrolet dealers No. 1.

So take your time. Look at all his used cars and trucks. There are plenty of makes and models to pick from.

You'll find his OK tag on the very best ones on his lot.

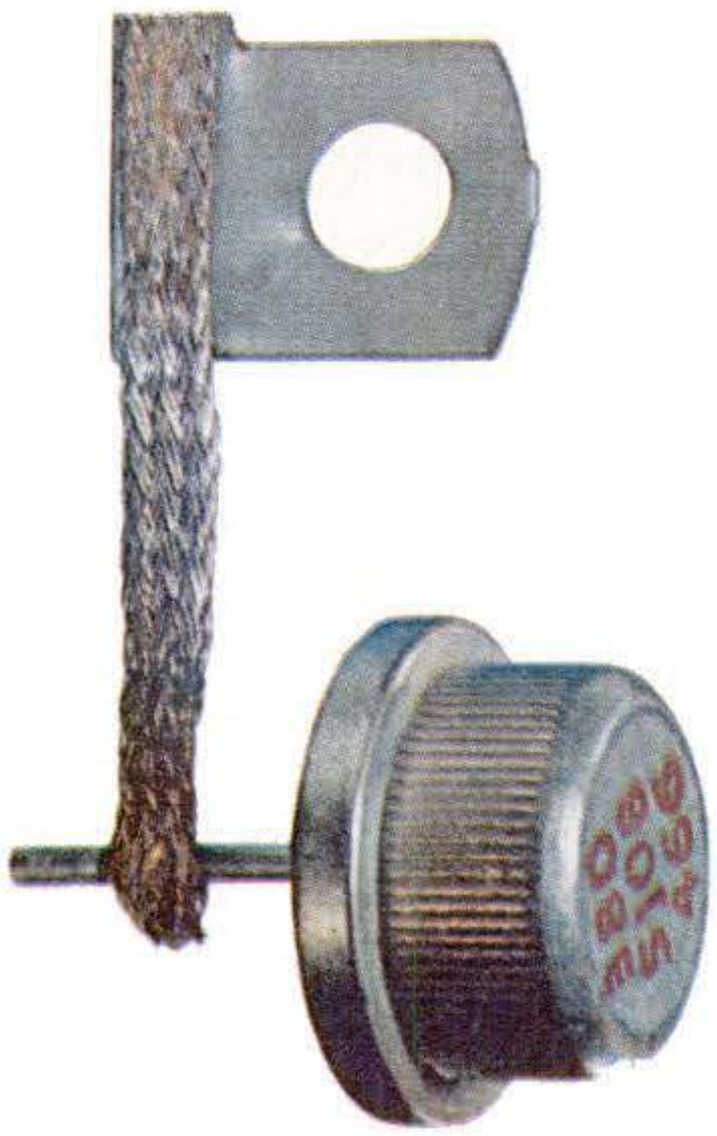
Your Chevy dealer wants you to be completely satisfied with your choice. After all, satisfied customers come back. Maybe for a new Chevy.

No wonder he works so hard to please you. Visit him soon. At the OK sign. Ok?

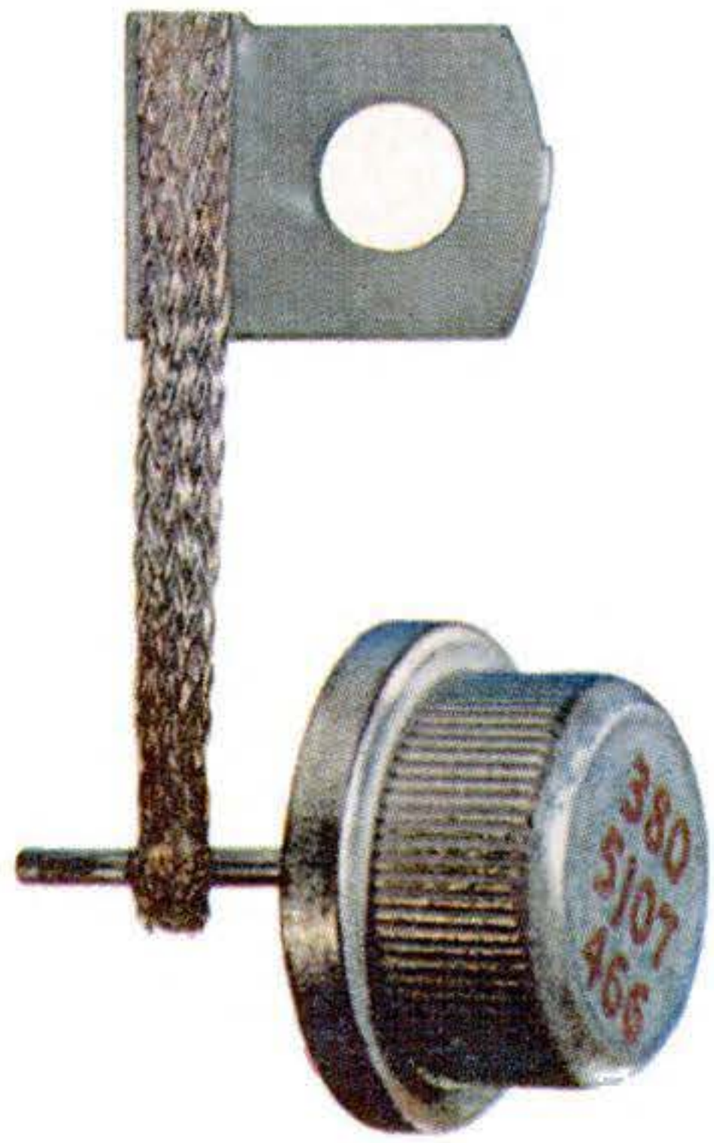
Chevrolet Division of General Motors, Detroit, Michigan.

Get a No. 1 Buy from a No. 1 Guy—Your Chevy Dealer.

Copyrighted material



This is a GM Original: It works like an electrical check valve.



This is a GM Replacement: Check.

General Motors rectifying diodes—three positive and three negative—change the alternating current from a high-output Delcotron generator to the direct current used in the electrical systems in today's cars and trucks.

And the GM Replacements look, work, and *are* just like the GM Originals.

Good parts and good service go together. So always replace GM Originals with Genuine GM Replacements.

Go where you know they use Genuine General Motors Parts. They're available all over the country, wherever you see the distinctive GM and United Delco packages. Check.

GENUINE GENERAL MOTORS PARTS

GM CHEVROLET • PONTIAC • OLDSMOBILE • BUICK • CADILLAC • GMC TRUCKS United Delco

Copyrighted material

No.1

More people buy MerCruiser than all other stern drives combined. Why?

Naturally, MerCruiser offers you all the popular advantages of a stern drive: inboard economy plus outboard maneuverability, portability and propulsion efficiency (propeller thrust is parallel to the plane of motion). But why does MerCruiser *outsell all other stern drives combined?* Start with the widest range of power ever offered — 8 models, 60 to 310 hp— including diesel power. Now add quiet that comes from features like rubber-mounted engine and Jet-Prop exhaust. Include impact protection like hydraulic shock absorbers which control kickup, shearproof propeller (no shear or drive pins) and automatic safety-tilt switch. And don't forget the widest selection of accessories in the stern drive industry, including single-lever throttle and shift control, Ride-Guide steering, fresh water cooling plus power steering, tilt and swivel. For more reasons why most of the stern drives going are MerCruiser, see your MerCruiser dealer! (60, 110, 120, 150, 170, 225 and 310-hp gasoline; 60-hp diesel). Worldwide sales and service.

STERN DRIVE POWER PACKAGES

MERCRUISER

KIEKHAEFER MERCURY
FIRST IN MARINE PROPULSION

Kiekhaefer Corporation, Fond du Lac, Wisconsin and Kiekhaefer Mercury of Canada, Ltd., Subsidiary of Brunswick Corporation

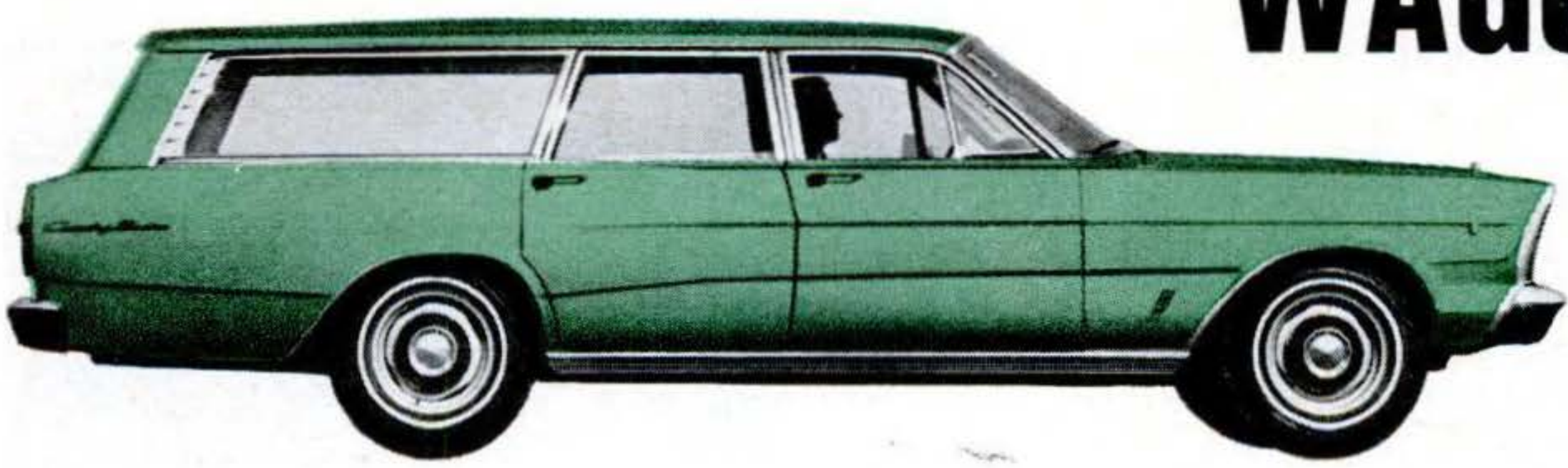
Copyrighted material

Popular Science
REG. U.S. PAT. OFF. MONTHLY

Look-alikes at first glance, these wagons have surprising differences. Our outspoken auto editor tells about his likes and dislikes

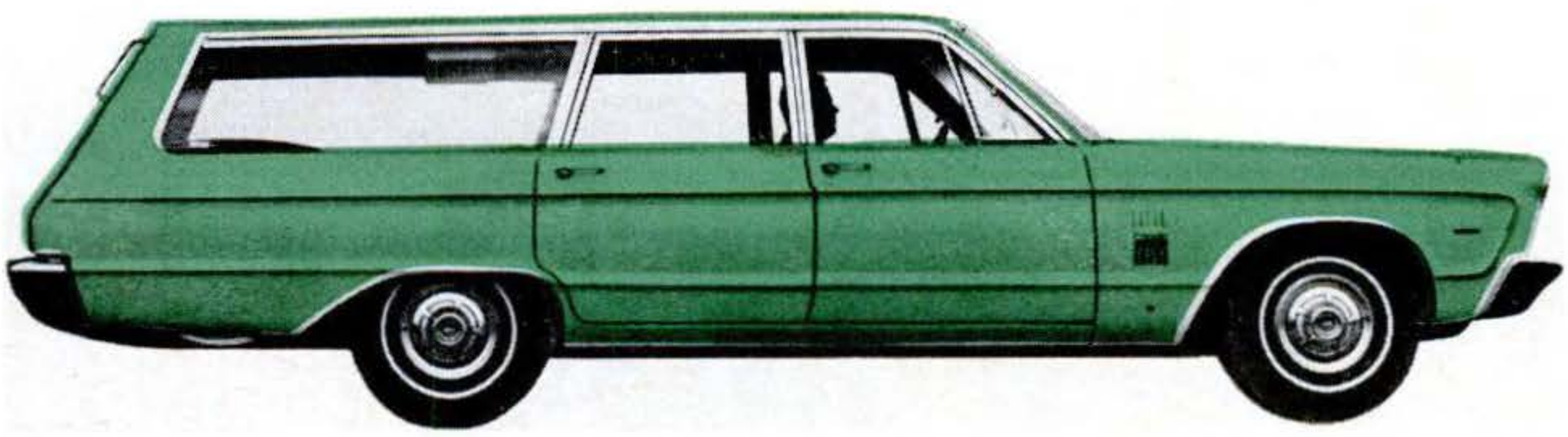
REPORT FROM THE DRIVER'S SEAT

COMPARING FORD-CHEVY-PLYMOUTH WAGONS



FORD is tops for passenger ease, thanks to its unique tailgate and rear seating.

CHEVROLET is tops in ride and handling. The body is as spacious as Ford's.



PLYMOUTH is tops in toughness. But in spite of longer body, it has no more space.

By JAN P. NORBYE / *PS Automotive Editor*
EXCLUSIVE PHOTOS BY BILL MORRIS

Knowing *why* you want a station wagon doesn't solve the problem of choosing the right one. Need eight or nine seats? Want about 100 cubic feet of cargo space? Or does your wife prefer a station wagon

Continued

Copyrighted material

Acceleration tests placed the 352-cu.-in. Ford halfway between the 283-cu.-in. Chevy and the 383-

for taking the kids to school while you drive the Jaguar to work? Or do you just need a no-nonsense everyday car that can carry all your gear on long trips and vacations? No matter what you're looking for in a wagon, Detroit makes it.

If you know the kind of loads you'll carry and the distances you'll drive, you can figure the type of engine and transmission you'll want. But before you make a decision, you ought to know the special features of each wagon.

Tailgates. Among the "low-priced three," the Ford stands out for its two-way tailgate and the face-to-face seats in the back. The optional third seats in Chevrolets and Plymouths face the rear. If there's little or no luggage, the Ford can carry six grown-ups and four children in comfort. Ease of entry (and exit) is remarkable, as the whole back panel swings open like a door to let the hindmost passengers into the caboose. It can also be used as a normal tailgate to provide an extension of the floor for carrying ladders, lead pipe, and long-stemmed roses.

Loading. Although our Bel Air had standard suspension, Chevrolet has a unique option in its automatic leveling. The Delco leveling system consists of Superlift rear shock absorbers linked to a height-control valve coupled to a vacuum-driven compressor. Delco claims that this improves steering control when the car is heavily loaded, keeps headlights properly aimed regardless of load, and prevents spring bottoming on bumps.

The question of loads is critical in all station wagons. Heavy loads should be located as close to the car's center of grav-

Continued

FORD Country Sedan's face-to-face tail-end seats will hold four children in comfort and easily converts into a mobile office for a busy auto editor.

FORD door-type tailgate allows a man to step right in with great ease. For the benefit of skirted passengers, the bumpers carry rubber-block steps.

Copyrighted material

cu.-in. Plymouth. Ford's standard 289-cu.-in. V-8 is lighter, almost equals the 352's performance.

CHEVROLET Bel Air's extra luggage space behind the back seat should be used last, as heavy loads behind the rear axle tend to upset the balance.

PLYMOUTH Fury III carries its spare wheel vertically in the body side and has a large luggage reserve behind the rear axle for light cargo.

CHEVROLET compartment can best be entered from side. Floor length (with back seat folded) is 96 inches, against 97 in the Ford, 95.7 in the Fury.

PLYMOUTH compartment is hard to enter and the opening handle is inconvenient. Cargo area is 44.9 inches wide against Chevy's 49.7 and Ford's 48.6.

Copyrighted material

FORD maintained 50 m.p.h. on a sharp, slightly uphill turn at full throttle. Speed dropped from 60 when I entered the turn. Body roll was moderate and the car understeered, with poor steering accuracy.

CHEVROLET matched Ford's speed through the curve and handled with high precision, although the

ity as possible to assure the least possible change in handling characteristics. Tire pressure must be checked and adjusted according to load. With a full load, the tires should have from four to eight p.s.i. more than with a normal load. With extra-light loads, it is advisable to run with the lowest tire pressures indicated in the maker's recommendations.

Tires. You may well wonder if the wagons have enough rubber on the road to cope with the enormous gross vehicle weights that are possible with curb weights of around 4,500 pounds. On the Chevy wagons, the standard tires are four-ply 8.55 by 14 (against 7.35 by 14 on the sedans). As an option for the wagons, Chevy offers eight-ply 8.55-by-15 tires.

The standard tires on Ford's Country Sedan are 8.15 by 15. Our test car had the optional 8.45-by-15 ones. On Plymouth Fury wagons, 8.55-by-14 tires are standard and 8.15-by-15 tires are optional in conjunction with front disk brakes. I feel that if the tires are properly taken care of, they will prove more than adequate for normal conditions.

Quality. The Fury's claim to fame among wagons is its sturdiness. Everything about it has a heavy-duty air, although the car is based on the sedan (with two-inch-longer wheelbase). I drove all the wagons on some pretty rough roads, and the Plymouth took everything in stride. The Chevrolet developed rattles from the tailgate area, giving rise to some questions about its quality of assembly, while the Ford was clearly the quietest but incapable of tackling poor road conditions with the same speed or matter-of-factness as the Plymouth station wagon.

Power units. Chevrolet's 283-cu.-in. V-8 is not only the highest-revving engine in this group but also develops its maximum torque at the lowest crankshaft speed. The marvelous flexibility of this engine allows the car to overcome the drawback of the two-speed Powerglide transmission in most circumstances. Chrysler Corporation's 383-cu.-in. V-8 is smooth, quiet, and powerful—probably the best all-around power plant in the whole range of Chrysler engines. It packs 270 hard-working horses that need less fuel than you would expect. During highway cruising, this engine is just as economical as the 318-cu.-in. V-8 in the same car.

Ford has many improvements in the '66 engines, but the changes in the 352-cu.-in. V-8 fall mainly in the area of durability and do not help its performance. The cylinder-head castings have added ribbing along the valve area to assure longer valve life and reduce valve-seat distortion. New pistons with "eyebrows" help prevent valve bending in case of over-revving.

On the road, Ford's "new, improved" 352-cu.-in. V-8 was a disappointment. This car was just a wee bit faster than the one we tested last year, with a 289-cu.-in. V-8. The difference in elapsed times over a standing quarter-mile was less than half a second. The use of a 3:1 axle ratio also puts the Ford at a disadvantage in comparison with the Bel Air and the Fury (3.36:1 and 3.23:1, respectively) in terms of acceleration. In highway cruising, however, the Ford's axle ratio assures a lower mechanical noise level.

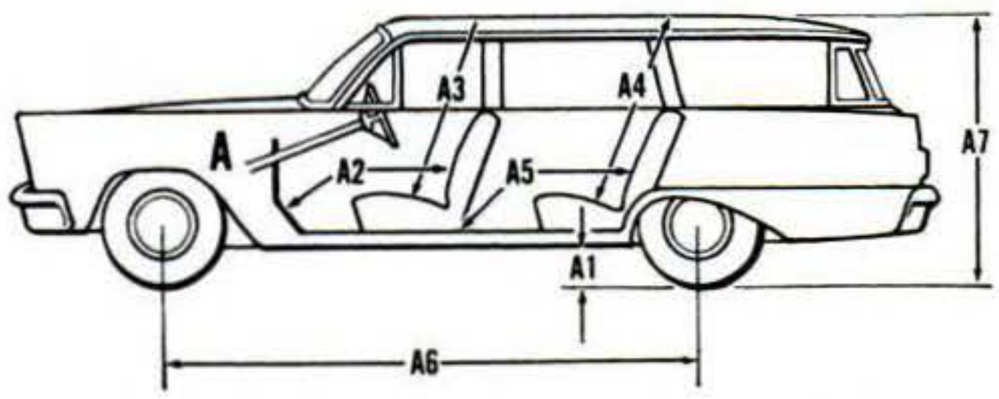
In traffic. The Chevrolet is the widest (80 inches) but it's also the easiest to drive

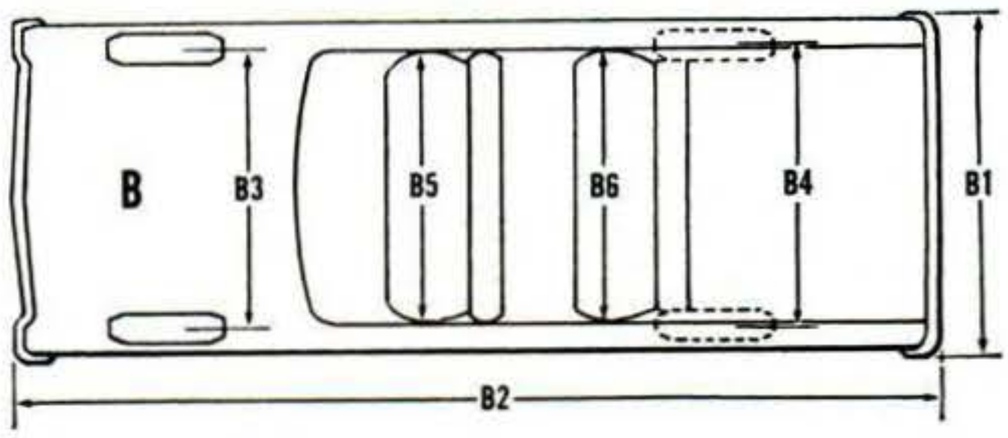
[*Continued on page 227*]

Copyrighted material

front end began to feel awfully light. Body roll was negligible and the tail stayed put.

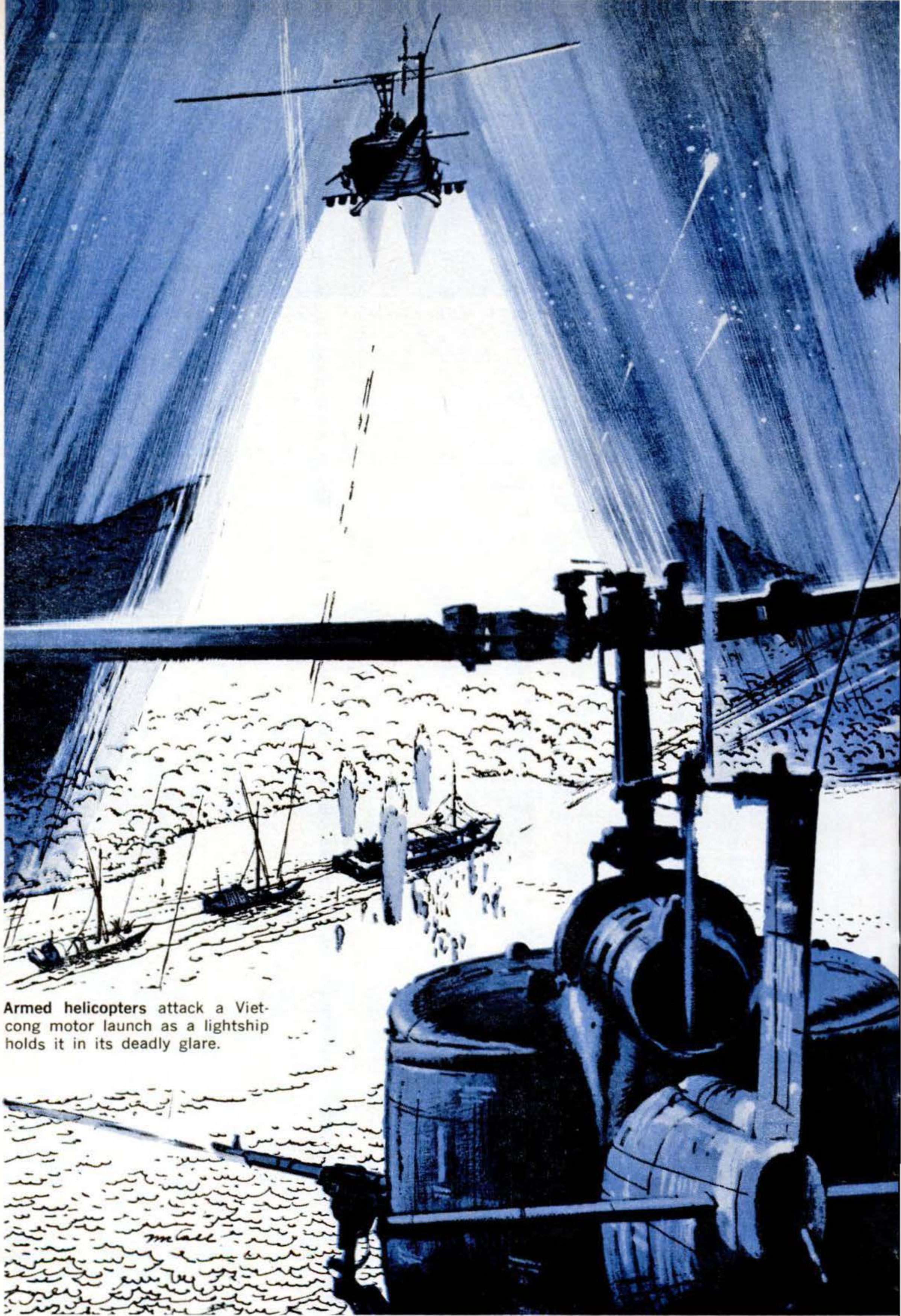
PLYMOUTH reached 60 m.p.h. where its rivals went through at 50, but the tail drifted out, calling for steering corrections. On quick wheel movements, there's a disconcerting lag before power assist catches up.





	CHEVROLET Bel Air	FORD Country Sedan	PLYMOUTH Fury III
DIMENSIONS (inches)			
A1 Ground clearance	6.2	6.1	5.8
A2 Front leg room	42.1	41.8	42.0
A3 Front head room	39.2	39.1	39.3
A4 Rear head room	38.8	40.0	39.3
A5 Rear leg room	37.5	36.9	39.6
A6 Wheelbase	119.0	119.0	121.0
A7 Overall height	56.7	56.7	56.8
B1 Overall width	80.0	79.0	78.2
B2 Overall length	212.4	210.9	217.4
B3 Front track	63.5	62.0	62.0
B4 Rear track	63.4	62.0	60.7
B5 Front-seat width	63.9	62.6	63.3
B6 Rear-seat width	63.2	62.7	63.5
SPECIFICATIONS			
Engine type	OHV V-8	OHV V-8	OHV V-8
Bore & stroke	3.875 x 3.00	4.00 x 3.50	4.25 x 3.38
Displacement	283 cu. in.	352 cu. in.	383 cu. in.
Compression ratio	9.25:1	9.3:1	9.2:1
Carburetion	Single 2-bbl.	Single 4-bbl.	Single 2-bbl.
Power @ r.p.m.	195 @ 4,800	250 @ 4,400	270 @ 4,400
Torque @ r.p.m.	285 @ 2,400	352 @ 2,800	390 @ 2,800
Transmission	Powerglide 2-speed and torque converter	Cruise-O-Matic 3-speed and torque converter	TorqueFlite 3-speed and torque converter
Final-drive ratio	3.36:1	3.00:1	3.23:1
Tire size	8.55 x 14	8.45 x 15	8.55 x 14
Steering ratio	19.4:1	21.9:1	19.4:1
Turns, lock-to-lock	3.52	4.00	3.80
Turn radius	20.4 ft.	20.8 ft.	21.4 ft.
Brakes, swept area	323.3 sq. in.	346.5 sq. in.	362.8 sq. in.
Curb weight	4,210 lb.	4,355 lb.	4,632 lb.
Basic price	$2,941.00	$2,998.75	$3,115.00
Price as tested	$3,330.00	$3,611.72	$4,600.30
PERFORMANCE			
0-60 m.p.h.	16.0 sec.	13.3 sec.	11.0 sec.
0-80 m.p.h.	30.3 sec.	25.2 sec.	20.4 sec.
40-60 m.p.h.	[illegible] sec.	6.7 sec.	5.7 sec.
50-70 m.p.h.	11.3 sec.	8.4 sec.	7.2 sec.
SS ¼-mile	20.77 sec.	19.50 sec.	18.12 sec.
Fuel mileage	14.1 m.p.g.	12.9 m.p.g.	11.7 m.p.g.

Copyrighted material



Armed helicopters attack a Viet-cong motor launch as a lightship holds it in its deadly glare.

Copyrighted material

PS EXCLUSIVE

Eyewitness report from Vietnam:

OUR FABULOUS CHOPPERS

...Prodigies of a New Kind of War

By JAMES H. WINCHESTER PAINTING BY BOB McCALL

It was after midnight and pitch black when the three U.S. Army UH-1B helicopters—called "Hueys"—lifted off at Tan Son Nhut airport near Saigon. On the lead craft was a cluster of seven landing lights, fixed to focus into a single beam strong enough to illuminate an area larger than a city block and turn the night into bright daylight.

Behind this "Lightning Bug" was a blacked-out

Continued

Copyrighted material

Hueys do everything—carry soldiers, haul supplies, act as gunships

gunship, dubbed the "Hog." In its nose was a turret fitted with a rapid-fire launcher, controlled by the copilot through an optical sight, for launching more than 200 high-explosive 40mm grenades a minute against ground targets up to 2,000 yards away. The third Huey, another darkened gunship, carried two dozen 2.75-inch rockets—maximum range almost two miles—fixed in two pods on each side of its hull.

Additionally, four M-60 machine guns, in powered flexible turrets, were externally mounted, two on each side of the chopper. Inside, their barrels sticking out the open doors, were two more .50-caliber machine guns. Together, these six guns, manned by the pilot, copilot, or gunner, could fire over 3,000 rounds per minute.

South of Saigon. A half-hour later, this covey of bristling whirlybirds was moving over the Mekong River Delta region, following the tortuous course of a jungle stream, looking for sampans. Anything that moves after dark in this Vietcong-filled Rung Sat area is assumed to be the enemy. The streams were slate gray, the surrounding jungle a contrasting black. An Army Mohawk light liaison plane, carrying infrared detectors to spot river traffic, flew ahead.

Door guns, firing circuits, and the traverse of the outside guns are checked once more. "The morphine," a pilot tells his crew, "is on the back of my seat harness. Everybody understand?" The crew nod.

The two gunships stay high. The lightship gets a target hint from the liaison plane. Down it goes. Its searchlight touches a cruising motor launch, passes it, swings back to hold it in its glare. The boat, towing several sampans, turns into the overgrown brush along the river bank. The lightship marks the position with a smoke grenade. From above, the two armed helicopters come in for the attack, one after the other, less than 20 feet above the water. From both sides of the river, intense automatic rifle fire is aimed at the slow-moving—65 to 70 knots—gunships. In the glare of the aerial spotlight, the 40-foot launch is vaguely visible in the reeds.

Rockets, machine-gun bullets, and grenades rain down. Fire spouts from the badly hit launch and sampans. The helicopters turn their fire on the river's banks. A hidden ammunition dump explodes.

The flight has been out an hour and a half; fuel is low. Fires burn below and clouds of smoke billow across the delta. The copters turn for home.

That's the kind of war being fought in Vietnam. Everything hinges on the helicopter, and nighttime search-and-destroy

Copyrighted material

A covey of helicopters sets out at left on a mission in Vietnam. The busy whirlybirds are being used much as trucks and jeeps were formerly used by the ground forces.

SP4 John H. Thompson of Antigo, Wis. (right), crew chief of UH-IB "Huey," directs a withering burst of fire from an M-60 machine gun at Vietcong troops hidden in the brush of Bencat range.

Low-flying helicopters convoy troops (below) moving through a field in Vietnam on a search-and-destroy mission. The armed helicopters spot and flush out hidden Vietcong.

missions like this are writing new chapters in battlefield tactics.

The Flying Crane. I flew in dozens of helicopters on a just-completed weeks-long visit to Vietnam. I rode with unarmed choppers carrying troops into battle and went with flying ambulances to pick up the wounded. One of the most interesting missions was aboard a giant Sikorsky CH-54A Flying Crane as it airlifted enough C rations in one trip to feed a force of about 700 men for three days.

The first of these giant choppers arrived in Vietnam in mid-1965 with the First Cavalry Division, which now utilizes more than 300 helicopters. Shortly afterward, a bulldozer was needed to help build a radio-relay station on a 1,200-foot mountain peak whose flanks are covered with dense rain forest. CWO David Jardine, of Washburn, Maine, eased the huge CH-54A off the ground, nimbly maneuvered a lever with each hand and nudged a pedal with

[Continued on page 208]

Copyrighted material

New REVOLVER-LIKE STEAM ENGINE

A zany—and tiny—power plant may soon be nestling in a sports-type automobile

By S. S. MINER

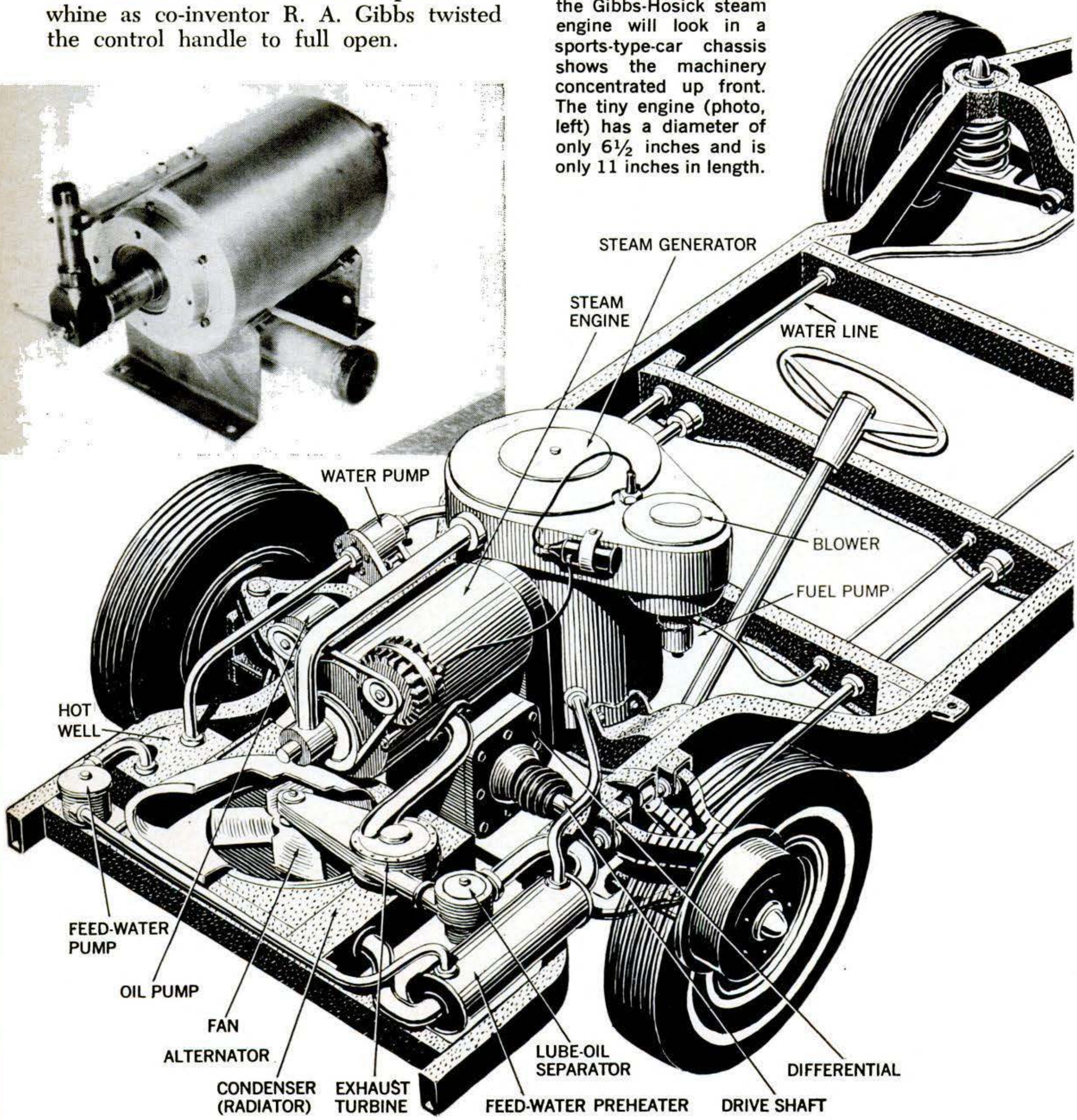
Clouds of oily steam spattered out of the exhaust pipe of a strange new engine. The sound level rose from a purr to a whine as co-inventor R. A. Gibbs twisted the control handle to full open.

Tom Hosick, Gibbs' partner, applied a revolution counter to the spinning shaft.

"Thirteen thousand, two hundred!" he yelled. "Better cut her off!"

What did they have here? In brief, a 60-pound, seven-cylinder steam engine developing 30 horsepower at 1,360 r.p.m.

Artist's concept of how the Gibbs-Hosick steam engine will look in a sports-type-car chassis shows the machinery concentrated up front. The tiny engine (photo, left) has a diameter of only 6½ inches and is only 11 inches in length.



Copyrighted material

produces 4.25 hp. per cubic inch!

with a 1,000-pound-per-square-inch supply. Not bad for an engine of 14.1-cubic-inch displacement!

Wait! That's not all. Hosick and Gibbs got *that* much out of their first engine. Now they have developed a more sophisticated version that produces up to 20 horsepower per cubic inch (at overload). Its normal rating is 4.25 per cubic inch—a total of 60 horsepower.

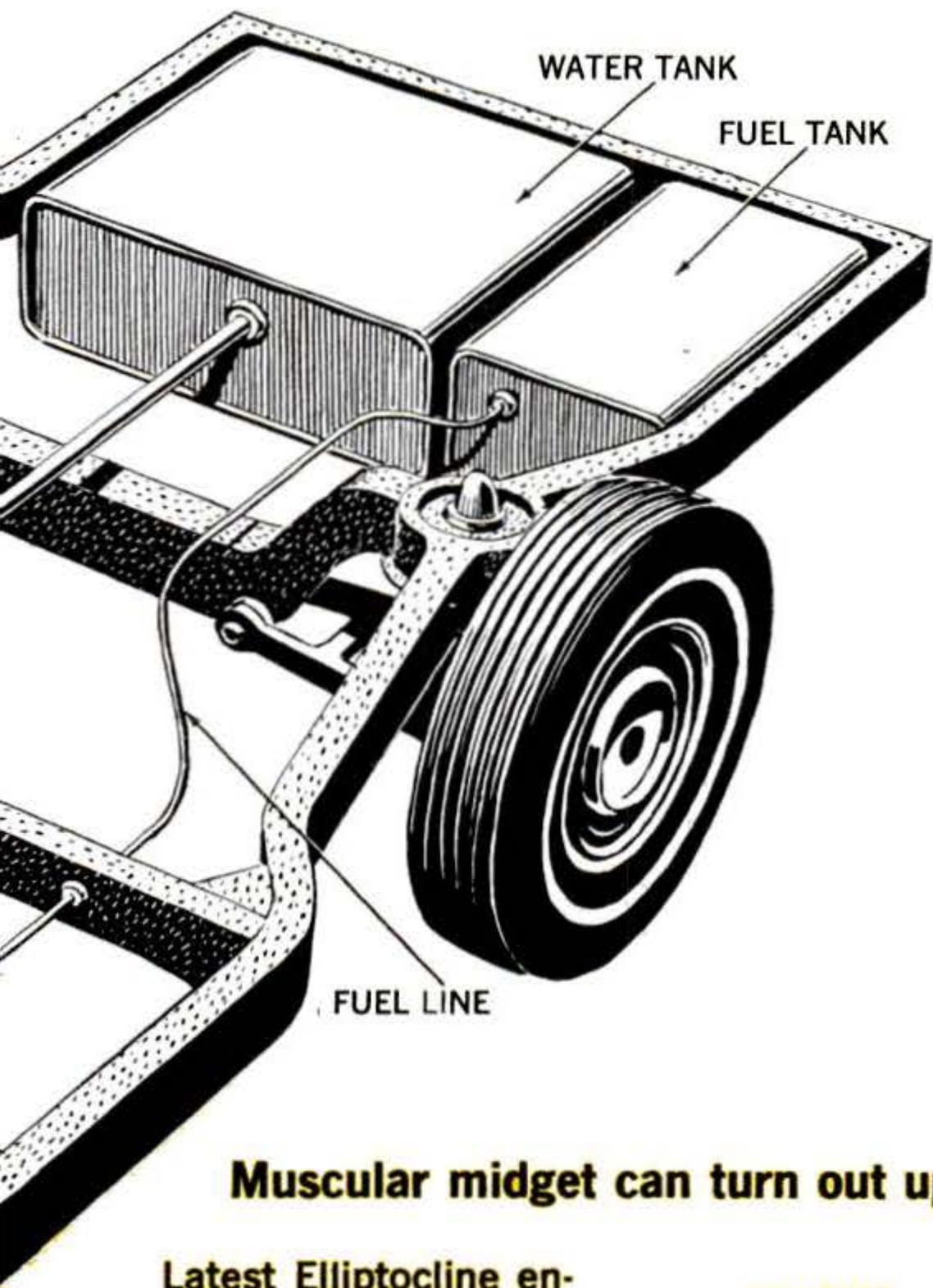
And wait again! *That's* not all. The two men are installing this latest engine in a compact front-wheel-drive car—as a test bed. The vehicle should be ready for road trials by the time this article is in print.

All this involves a new kind of steam engine. Just how new, the inventors actually don't know themselves.

Inside an oatmeal box. The cylinders are arranged somewhat like those in an old Colt .45. One critic says it looks like a metal oatmeal box lying on its side. The latest engine has nine, instead of seven, cylinders, and 18 pistons—two for each cylinder. Paired, the pistons move in opposite phase. Thus the engine is in perfect dynamic balance. It is so vibration-free that a coin can be balanced on it on edge.

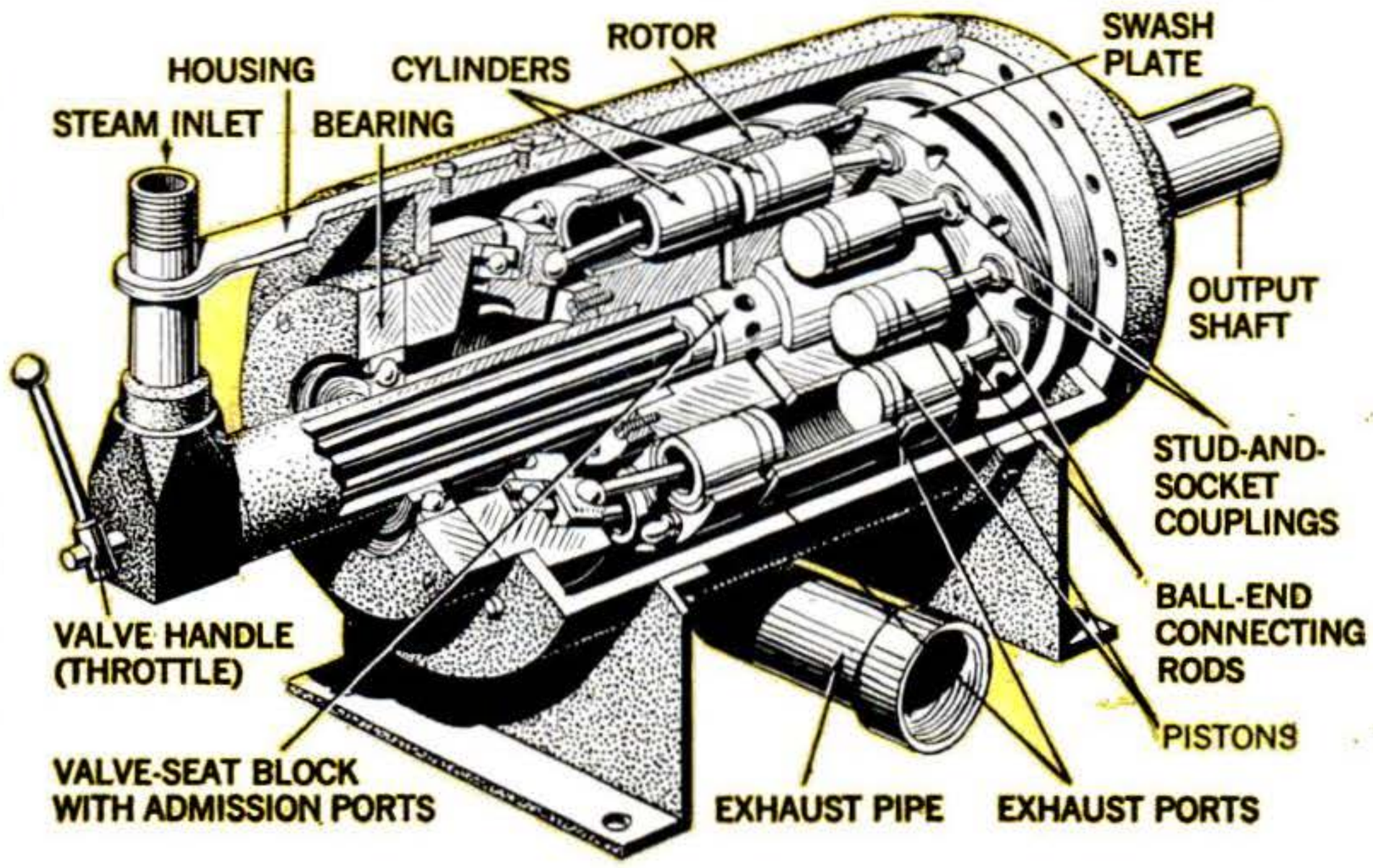
And where does the power go? On to swash plates. In the ordinary swash-plate engine the cylinders are stationary, and the plate rotates. In the engine designed by Gibbs, of Greensboro, and Hosick, of Winston-Salem, N. C., the cylinders rotate and the swash plates are stationary.

Continued



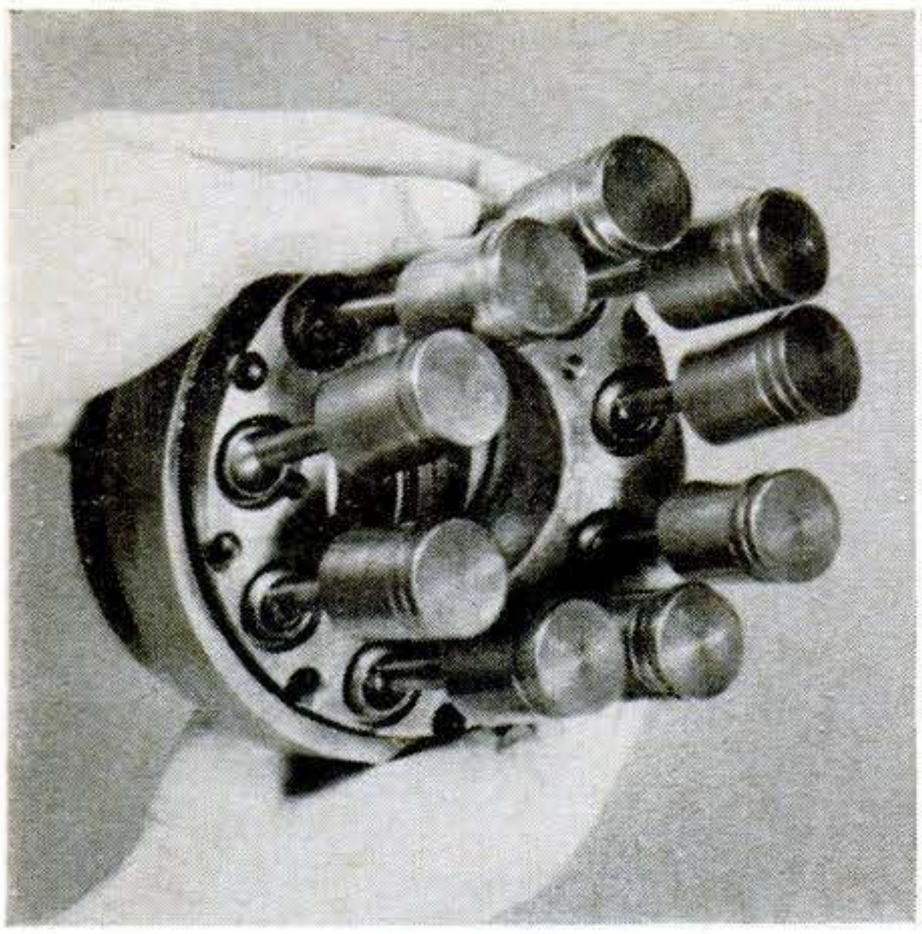
Muscular midget can turn out up to 350 hp. and a torque of 290 pound-feet

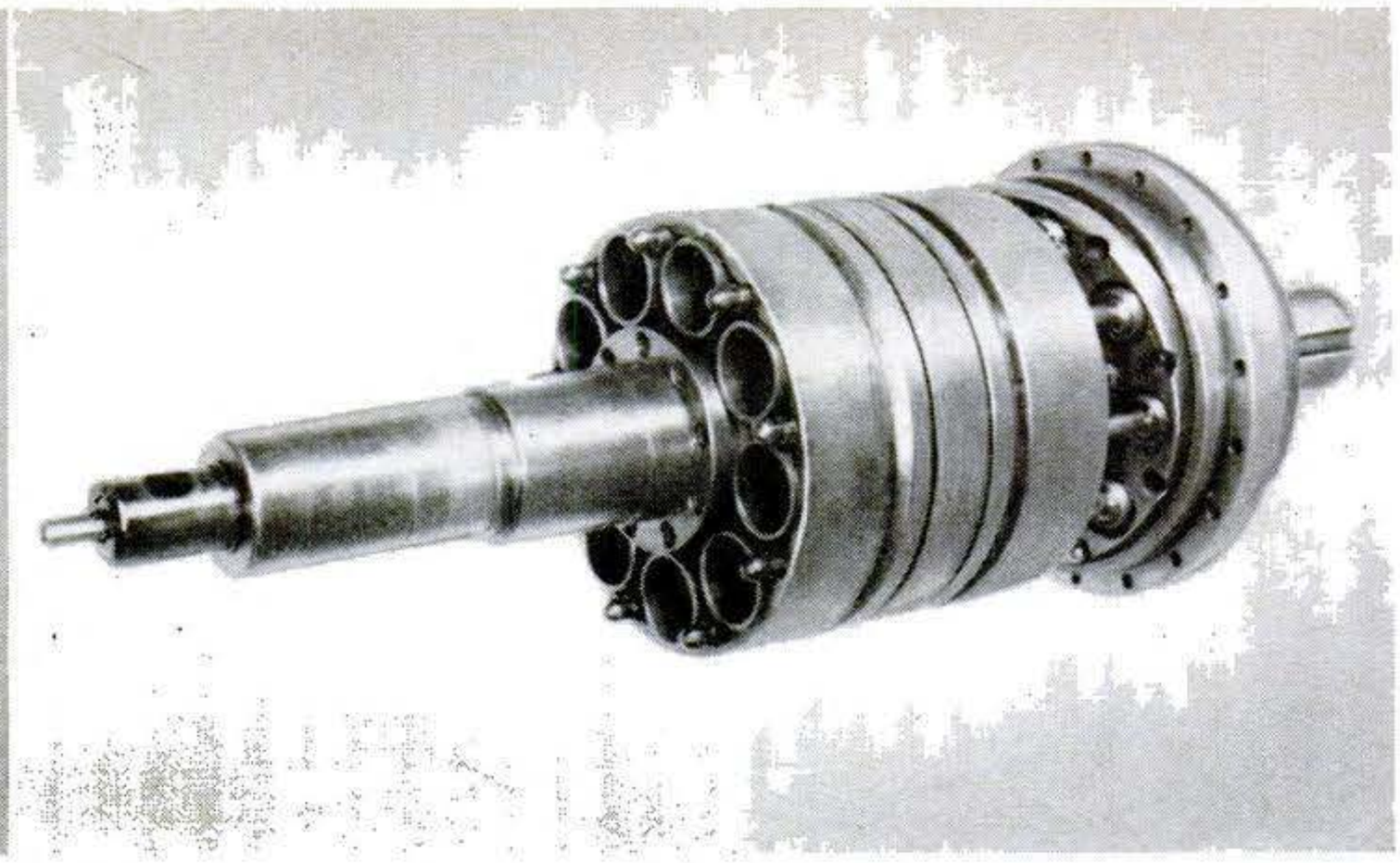
Latest Elliptocline engine, with cylinders arranged as in revolver, produces 60 hp.—up to 350 "overloaded." Top torque is 290 lb.-ft. Steam, entering a cylinder at center pushes two pistons outward. Cylinders and output shaft rotate as ball-end connecting rods push on drive rings and swash plates at engine's ends. Stud-and-socket coupling between rings and rotor keeps them in phase.



Copyrighted material

Ridiculously simple compared with internal-combustion type, engine is almost





Exploded view of the Elliptocline shows its simplicity compared with a typical internal-combustion engine. That's one clue to its almost vibrationless operation at its maximum r.p.m. of 10,000. It produces its highest torque at "stall"—just as it begins to turn over. The Elliptocline is an inherently high-speed machine. Used in an automobile, it needs gears to adapt engine speed to low vehicle speed. Exhaust steam leaves the cylinders through peripheral slits in the engine block.

The engine is a marvel of simplicity. It has no cranks. The first version of it used small poppet valves. The latest version uses a stationary, central distribution valve feeding steam in sequence to the cylinders.

How it all began. The story of the Gibbs-Hosick engine begins in February, 1964. In that month's issue of POPULAR SCIENCE the two men read of a radical new automobile engine. Designed in England by an engineer-inventor named Austin Mercer, the engine had radially arranged pistons, their crowns facing a central shaft. The pistons slid outward on their power strokes, and a roller on the wrist pin of each piston pushed against a peripheral figure-8 cam track inside a fixed, drum-like housing.

The offbeat design appealed to Gibbs and Hosick. As members of the Steam Automobile Club of America, they had been searching for a new slant on steam power. Among their first designs was a near duplicate of the Mercer engine. But they discovered that the figure-8 cam form would impart severe acceleration forces to the pistons.

In the next version they used a near-elliptical cam. Presently they realized that to get the horsepower needed in an automobile, a radial engine would be impossibly large. Other forms were tried (on paper) until they wound up with the final revolver-like design. This allowed them to keep what they thought were the two best features of the Mercer engine, the stationary admission valve, and cams instead of a conventional crankshaft. The cam problem had a beautiful solution: In this final design they became tilted plane surfaces.

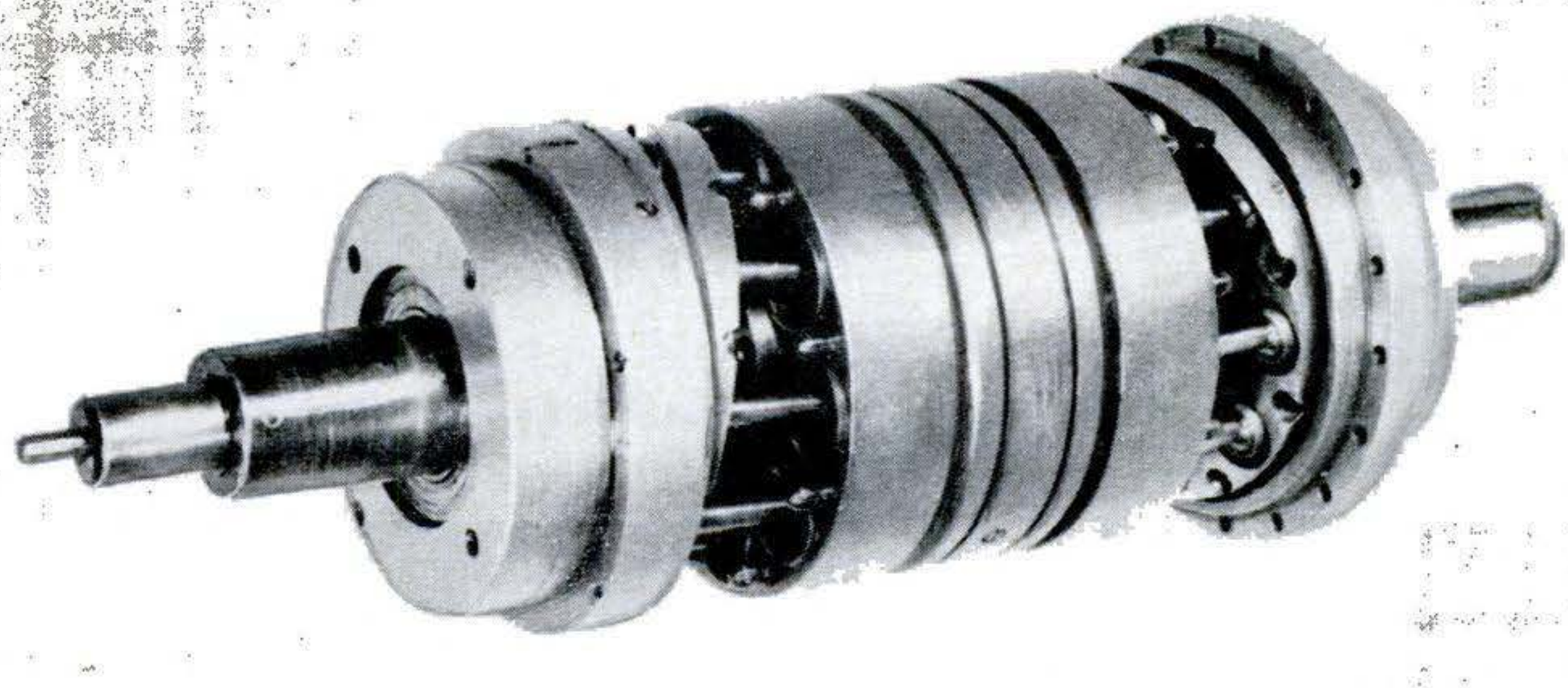
They built their first Elliptocline engine—as they call it—with free pistons and, because of trouble with the admission-valve design, poppet valves. It ran like a top. But the pistons clattered on deceleration and reversal, and the poppets were noisy. In the newest engine, they put ball-ended rods connecting the pistons to bearing-mounted rings. This ended the clatter.

This change, interestingly, took most of the side load off the pistons, but required that the rotating cylinder block be keyed in some manner to the inclined rings. A stud drive accomplishes this. The sliding central admission valve replaces the poppets. Besides controlling the sequence in which steam is admitted to the cylinders, this valve regulates the portion of the stroke during which admission takes place. This is called "cut-off," and on this engine can be varied from three to 75 percent. The same valve, by a slight change in position, also controls direction of rotation.

In all these designs, the uniflow method of exhaust was used. This simply means that the exhaust steam exits through ports in the cylinder wall at the end of the stroke. "Uniflow" is steam-engine parlance for this scheme, which is also widely used in two-stroke internal-combustion engines, and was shown in the PS story.

Copyrighted material

vibrationless, produces highest torque at start



Assembled, without its housing, the entire engine is scarcely twice the size of a single cylinder in a high-horsepower gasoline engine. The output shaft is visible at right. The inventors say that with a "continuous rating" of 60 hp.—that is, a fraction of the power available with "overload," produced by temporarily oversupplying the boiler with water —the engine can drive a car the size of a Volkswagen Karmann-Ghia 100 miles an hour. Ultimate target in fuel economy is 50 miles per gallon.

Fully half of any steam system is the apparatus for steam generation and control. The inventors are working on a steam-generating system of the monotube flash type. Temporarily they will adapt one of the generators already developed by other members of The Steam Automobile Club for modernizing old steam cars.

The lure of steam. Why should anyone, in the 1960s, be talking seriously about powering an automobile with steam? In the 60-odd years since steam was dropped in favor of internal-combustion engines, the conventional gasoline engine—to get efficiency, high speed, acceleration, and reliability—has been made quite complicated, a far cry from the simple early ones. Certain problems have never been licked.

The main thing that made the internal-combustion engine look good in the first place, the appealing simplicity of burning the fuel-and-air mixture inside the cylinder directly against the piston (instead of the roundabout method of boiling water, then sending steam into the cylinder), has never been quite satisfactory. It is impossible to get complete combustion in the split second of time available. This is not only wasteful, but it is one of the principal causes of city smog. It also delivers poor torque at low speed, and must use some kind of transmission. The modern automatic transmission is complex, expensive, and not exactly trouble-free.

In the steam engine with a continuous fire under a boiler, combustion is complete and smogfree. As for torque, full boiler pressure (of as much as 2,000 p.s.i. in a modern engine) can be brought against the piston for a considerable portion of the stroke, as contrasted with the momentary peak of 500 to 1,000 p.s.i. in an internal-combustion engine.

Most large steam-electric installations today use the reheat regenerative cycle. Gibbs and Hosick believe the Elliptocline will lend itself to a similar cycle, which will beat the efficiency of a diesel.

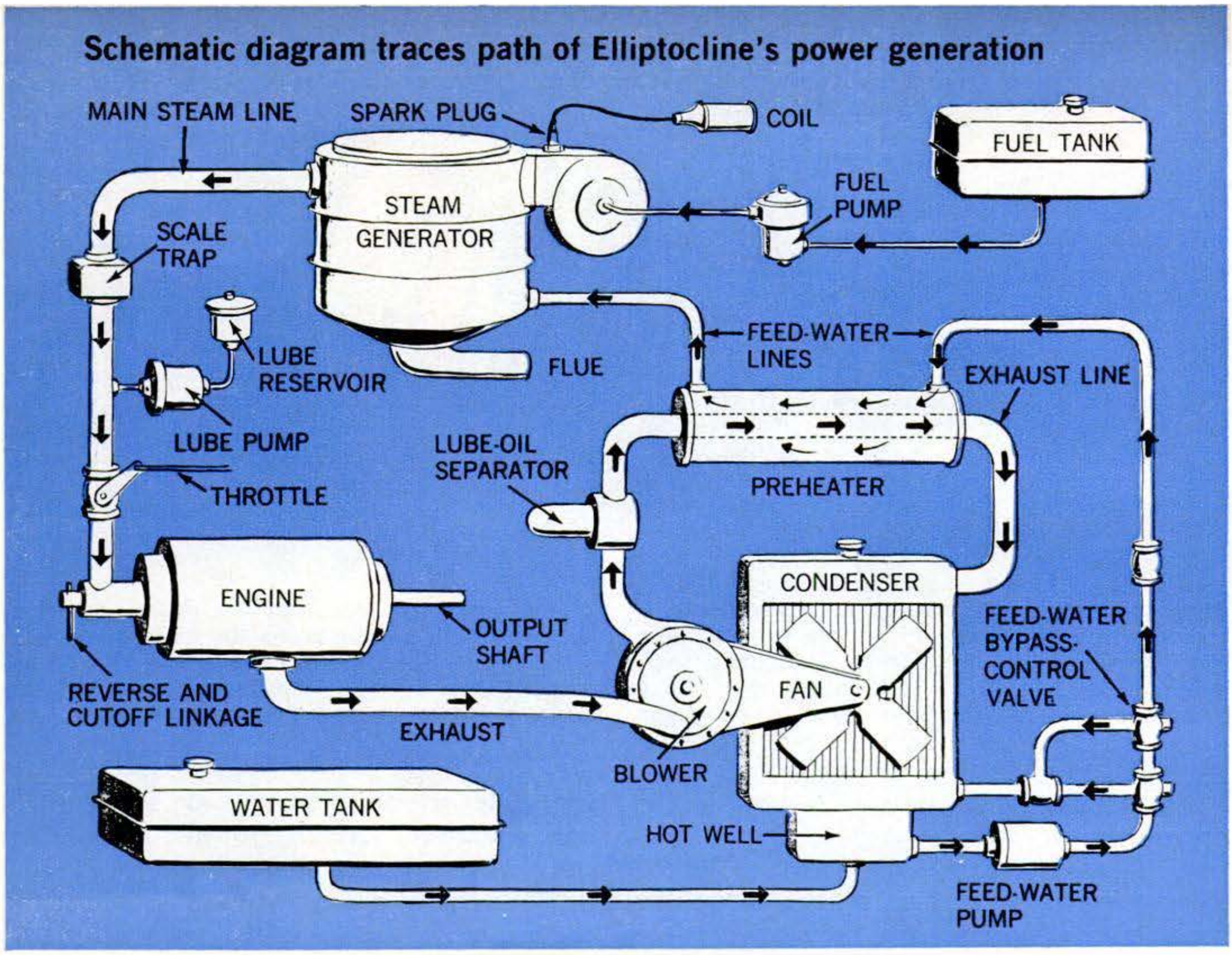
What have Gibbs and Hosick invented? They say: "We don't really know, yet. Some of the ideas we're using have been used in hydraulic pumps and swash-plate engines. Maybe our admission valve is new. We're not revealing its details. We think the Elliptocline will be able to compete with internal combustion in quite a few applications."

One large truck manufacturer has already expressed interest in the Elliptocline. In marine use, an Elliptocline could be well down in the hull, permitting very low shaft angles. Its silence and lack of vibration, and the ready availability of cooling water for condensing purposes, might make this one of the early applications.

Explosion of the boiler—bugaboo of early steamers—is a seldom-encountered problem with a single-tube flash-type generator used by the Elliptocline. There is little water

Continued

Copyrighted material



Steam is generated in a "monotube boiler," a spiral of several hundred feet of steel tubing, and then passed through a steam and throttle valve on its way to the engine. Exhaust steam drives a fan pulling air through condenser, much like an ordinary radiator. Condensate drops into a hot-well and is fed back to boiler. Water losses are made up from a reserve tank. Fuel—either diesel oil or regular furnace oil—is burned in a blower-fed fire resembling that of a household oil burner.

Here is how the Gibbs-Hosick steamer is expected to compare with a sports-type car like the Volkswagen Karmann-Ghia:

	Elliptocline	VW
Total weight (lb.)	1,950 (est.)	1,930
Engine weight (lb.)	60	278
Steam generator wt. (lb.)	325	——
Bore and stroke	1 x 1	3.03 x 2.72
Displacement (cu. in.)	14.1	78.4
Hp. @ r.p.m.	60 @ 2,470	50 @ 4,600
Hp. per cu. in.	4.25	0.49
Torque @ r.p.m.	290 @ zero	68.7 @ 2,600
Fuel	diesel oil	gasoline
Fuel consumption (m.p.g.)	28 (est.)	25-35
Steam pressure/temp.	2,000 psi @ 850 F.	——
Max. continuous water-evap. rate	720 lb./hr.	——
Water consumption	12 lb./hp.-hr.	——
Rear-end ratio	4.48:1	4.375:1
Overall gear ratios (:1)	Not determined	1st 16.60 2nd 9.00 3rd 5.78 4th 3.89
Acceleration 0-60	Below 10 sec. (est.)	21.7 sec.
Top speed, continuous	100 m.p.h. (est.)	80 m.p.h.
Reserve max. speed	Over 120	87

in the system at any one time, and as the largest aperture for escape is the diameter of the boiler tube, a break would not lead to havoc. I witnessed the rupture of a small generator carrying 600 p.s.i. Only a puff of steam resulted.

The builders of the Elliptocline are newcomers to steam engineering—perhaps an advantage. They had no preconceived ideas to discard when they tackled their engine.

Tom Hosick, a research chemist, began boning up on thermodynamics a few years ago when he heard an automobile manufacturer say that steam-car performance was the ideal to aspire to in engine design. He does the theoretical work on their project. R. A. Gibbs owns a machine shop and foundry business—and drives a 1901 White steamer.

They concede that the gasoline engine is not much more complex than the steam engine when steam generation is included. But include the transmission, and the steam engine has far fewer moving parts. PS

Copyrighted material

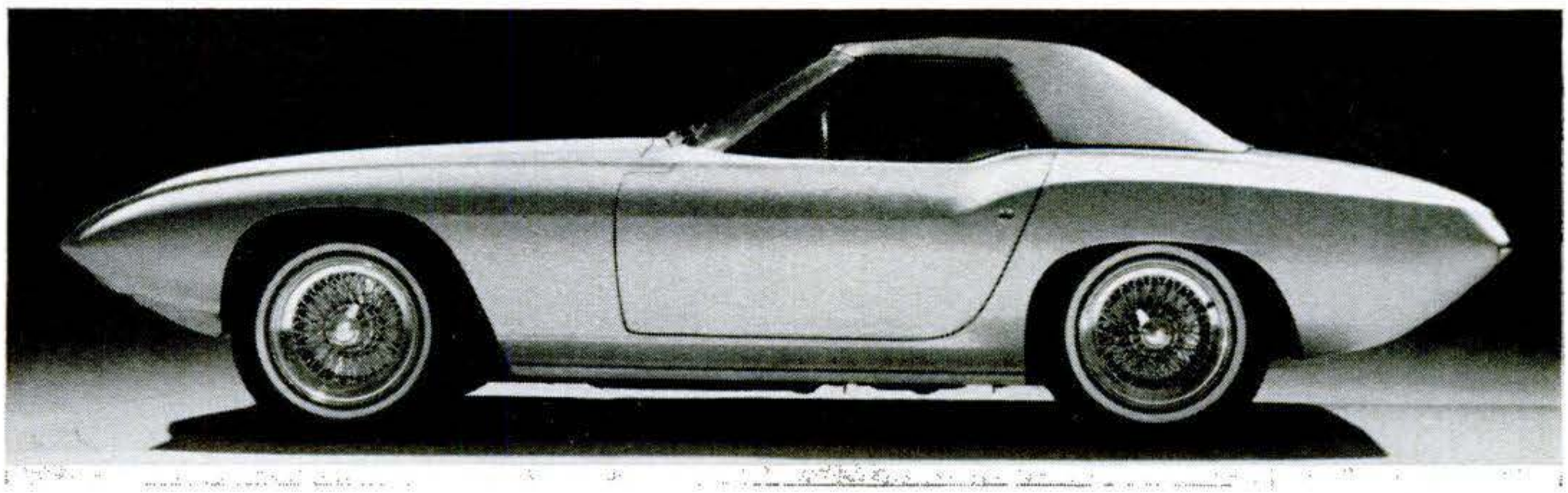
No-ladder gutter cleaner

No need to climb a ladder or scramble on the roof to clear leaves from your gutters and downspouts if you use this extension nozzle attached to your garden hose.

Of seamless aluminum tubing, the Water-Sprite nozzle telescopes from its 5½ feet at contracted position to a fully extended 10 feet. It's made by B & D Industries, Box 185, Pickens, S. C., and sells for $10.95.

Water jets to speed Navy ships to 85 m.p.h.

A flippered frogman is shown in a test tank above making adjustments on a small working model of a jet-propulsion engine intended to raise the speed of Navy vessels to up to 85 m.p.h. Water enters an intake at the bottom of Lockheed's finned equivalent of an aircraft jet engine, passes through powerful pumps, and is then expelled with great force.



Ford's newest Cobra makes debut

Bordinat Cobra, Ford's newest two-passenger experimental sports car, was previewed at this winter's Detroit Auto Show. The prototype, tailored to specifications of the 427 Cobra now in sports-car competition, exceeded 100 m.p.h. when tested on the Dearborn high-speed track. It was powered by a 289-cubic-inch V-8, using a heavy-duty Fairlane automatic transmission.

Copyrighted material

World's First Supersonic

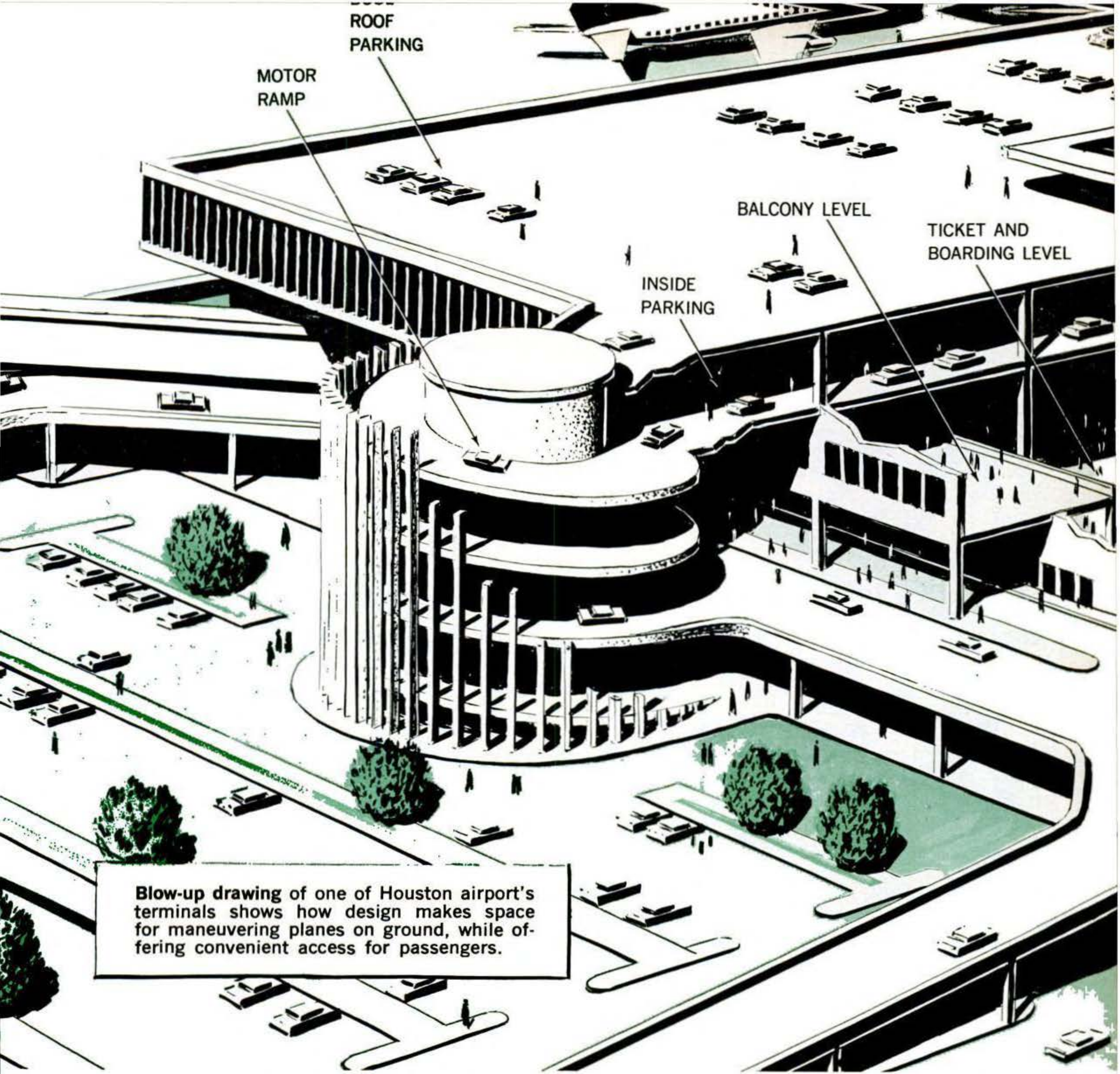
It's big—even by Texas standards.

The Houston Intercontinental Airport site sprawls over 7,000 acres, 16 miles north of the booming city. Slated to open next year, the $150-million facility will be the first terminal capable of handling the supersonic airliners that are expected to become operational in the mid-70s. The new airport will provide plenty of room for the huge planes to maneuver on the ground and also be one of the most convenient ever devised for handling passengers.

Houston's director of aviation, Joseph A. Foster, says an airplane terminal is really a connection between two types of transportation: the auto and the airplane.

Despite the long distances between the four terminals in the airport, no passenger

Copyrighted material



Blow-up drawing of one of Houston airport's terminals shows how design makes space for maneuvering planes on ground, while offering convenient access for passengers.

Jet Airport

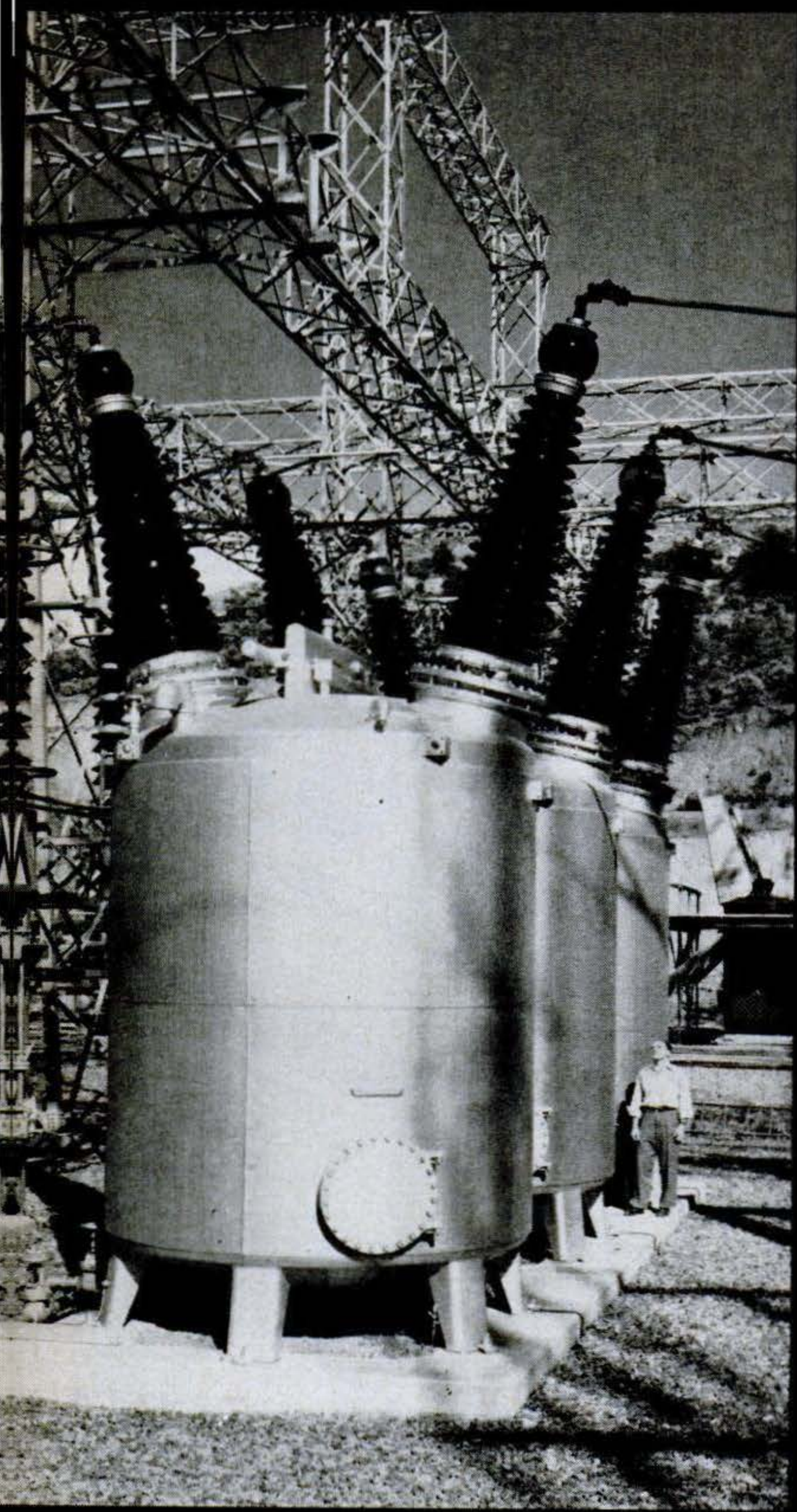
will have to walk more than 400 feet to or from his car or airport conveyance.

A mile-long air-conditioned tunnel will connect the terminals, as well as a 150-200-room hotel and the parking facilities. Escalators and elevators will speed passengers between levels, while a battery-powered train will carry them between the airport's five major buildings.

Each terminal unit will have four flight stations and 20 gates for boarding planes. The buildings will be sandwiched between two 9,000-foot runway, taxiway, and high-speed turnoff complexes. Eventually the runways will be lengthened to 12,000 feet. Roads around the terminal area will be recessed six feet below flight ramps and deflectors will be installed to keep jet exhausts from blasting passing traffic.

Initially only two units will be opened, but by 1980, the entire airport will be in operation, capable of handling more than six million passengers annually.

BLACKOUT:



Today's generating stations have a tremendous job in just switching a 230,000- or 345,000-volt transmission line on and off. It takes a lot more than a wall switch. Monster circuit breakers like these have been designed to do the job. The inside is filled with oil to quench the arc when contacts make or break. A newer type blows the arc out with a great blast of air.

Huge, nationwide power grids bring you cheaper and more-reliable electric power. But the tie-ins can also bring disaster, as in the recent Northeast blackout. Here's the inside story of our power networks

By C. P. GILMORE

There's only one honest answer to the question posed above.

Yes.

The recent Northeast blackout demonstrates how. Unless you live in one of a few remaining isolated communities, your electric power system is tied into a grid very much like the one that failed and left 30 million people in the dark. That blackout, the biggest in history, started near Niagara Falls on Nov. 9 last year, spread north to Toronto and east across New York State.

Rapidly, the crashing curtain of darkness closed over Rochester, Syracuse, Albany, leaped the state line into Massachusetts and Connecticut, New Hampshire and Vermont, blacked out Boston, Hartford, and thousands of towns and villages all over New England. Finally, 12 minutes after the first flicker, it plunged into New York City. Eight million people at the height of the afternoon homeward rush, swarming along sidewalks, packed sardine-like in subways, jammed in stalled elevators, caught in com-

Copyrighted material

Can It Happen in Your Town?

muter trains, were suddenly in the dark. Without traffic lights, the streets turned into a snarl that would not be untangled for hours.

But despite the world-wide publicity it received, several important points have not been widely reported.

First: In 1962, sections of Iowa, Missouri, Kansas, Nebraska, South Dakota, and Minnesota were blacked out in almost precisely the same way, as generating stations went down like a row of dominoes. The same section went dark again about a year ago—on Jan. 28, 1965. In June, a large section of the Southwest was blacked out when an operator threw the wrong switch.

Second: While most people were shocked to learn that such a thing could happen, the recent blackout came as no surprise to power engineers, who have always known that our interconnected system is vulnerable.

Third: Although previous blackouts have pinpointed specific weaknesses in our electrical systems and methods of dealing with them, preventive measures have not been widely applied. Will the lessons learned in the Great Northeast Blackout help prevent a similar failure where you live?

Let's make one distinction. We're not talking about local power failures. These failures are annoying, but usually not serious.

But the big ones are more than nuisances. And big cities, with people trapped in subways and elevators, and traffic stalled, aren't the only places they can hurt. More and more of the nation's homes are becoming totally dependent on electricity for everything—cooking, heat, light, in many cases water.

The grid problem. These big blackouts grow not from local-line or transformer failures, but from far more complex causes involving what engineers call the inter-tie system or grid.

Years ago, each community had its own generator. As a town grew, electric companies installed more generators, but they were all separate. Gradually, as the industry expanded, it occurred to engineers that they could do better by hooking generators together in coordinated systems. Then, if one generator failed or had to be repaired, the others could pick up the load.

Then along came high-voltage transmission lines and, with them, the ability to transmit large amounts of electric power over long distances. Now system planners could not only hook generators in one area together, they could put up huge high-voltage lines and connect separate systems. Then companies could swap power on a large scale and help each other in emergencies. Such interconnected systems are called power pools.

The system—most of the time—works beautifully. In California recently, one company lost a staggering million kilowatts of generating capacity. The lights didn't even blink. Neighboring companies picked up the load instantly.

One reason: money. There's another advantage: Tying separate utilities together saves money. Big generators operate far

Continued

Power companies are run from control rooms like the one at right in New York City. Operators in such rooms keep constant tab on every generator, distribution point, and grid connection in the system. It was because of wrong decisions in such rooms that the big blackout spread over 80,000 square miles.

Copyrighted material

more efficiently than small ones. Two utilities that need more generating facilities now frequently pool their money and build one huge station instead of two smaller ones. Both hook into it, and both get power for less than it would cost if they did it alone. Or a company straining to meet its peak load will buy cheap power from a neighboring system rather than run its own inefficient emergency generators.

There's still another reason for pooling. On the West Coast, for example, both the northern area and the southern area need a certain steady amount of electricity year-round for lights, TV sets, and so on. In addition, each has a heavy seasonal peak. In the north, the big load comes with electric heating in the winter. In the south, it's summer air conditioning.

With separate systems, each section would have to build enough generating capacity to meet its peak load. With pooling, each can build only enough for its base load, plus a much smaller reserve. Then in the summer, the northern system sends excess power south; in winter it goes the other way. Peaks occur at different times of day in different sections, and pools allow utilities to take advantage of this, too.

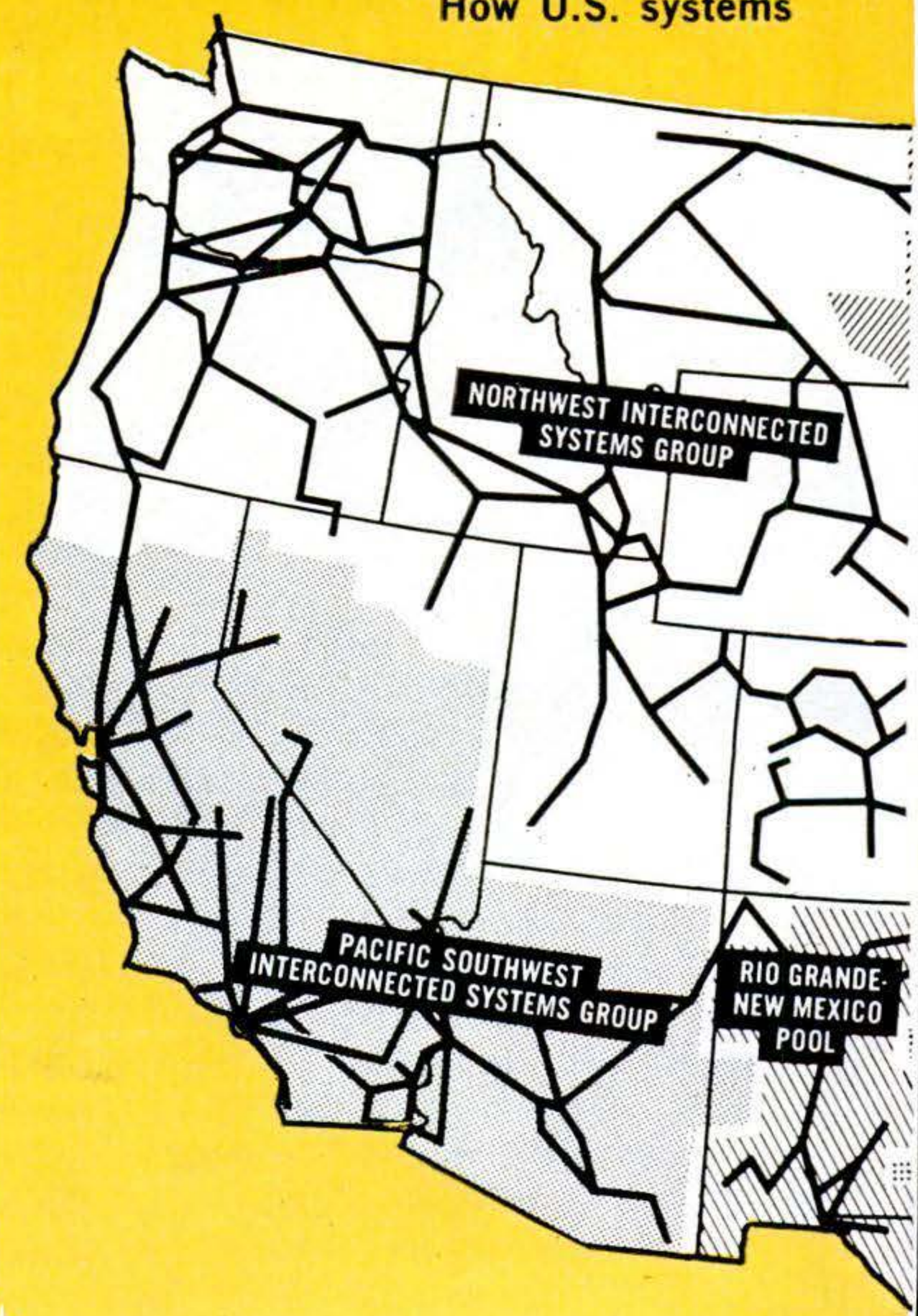
Electric power, of course, can't be stored; it must be made as the customers ask for it. For example, you flip on a light switch. This adds slightly to the load on a generator in the system. Loaded down a little more, the generator slows very slightly. A governor senses the slowdown and feeds more fuel to the generator, bringing it back up to standard speed—60 cycles per second. As more and more lights go on, the generator finally reaches its maximum capacity. Then the system operator either starts up another generator or arranges with another company to send in a block of power.

Computers keep tabs. To check on the constantly fluctuating demand and to help decide when to buy power, when to make it, and when to sell it to other pool members, most companies now use computers. The computer constantly watches voltages, frequencies, and loads all over the system, and from time to time tells the system operator which generators to bring on line, or suggests that he buy outside power.

Today, 97 percent of the nation's generating capacity is tied into these co-op pools. Virtually every generator east of the Rockies is now tied in to one vast grid; those west

[*Continued on page 222*]

How U.S. systems



The high-voltage-transmission system is growing constantly; a half dozen interconnections are now being built across some of the major blank spots in the West. They'll be in service by spring. Despite the map's crowded appearance, the country, however, is still far from having what power planners call a "national grid"—a tightly interconnected system that could be used to send large amounts of power great distances across the country.

Tightest connections of greatest power-carrying capability are now generally within the regional "pools," shown in different tones. Pools, for the most part, are connected with each other only by relatively light interconnections. The Federal Power Commission has recommended that the system be expanded into a true "national grid" by the construction of many heavy, long-distance inter-ties that could move massive blocks of power between pools—even across many states. Power companies, in general, are opposed to such a plan, preferring the continued gradual build-up of the inter-tie system.

Copyrighted material

interconnect through high-voltage transmission lines

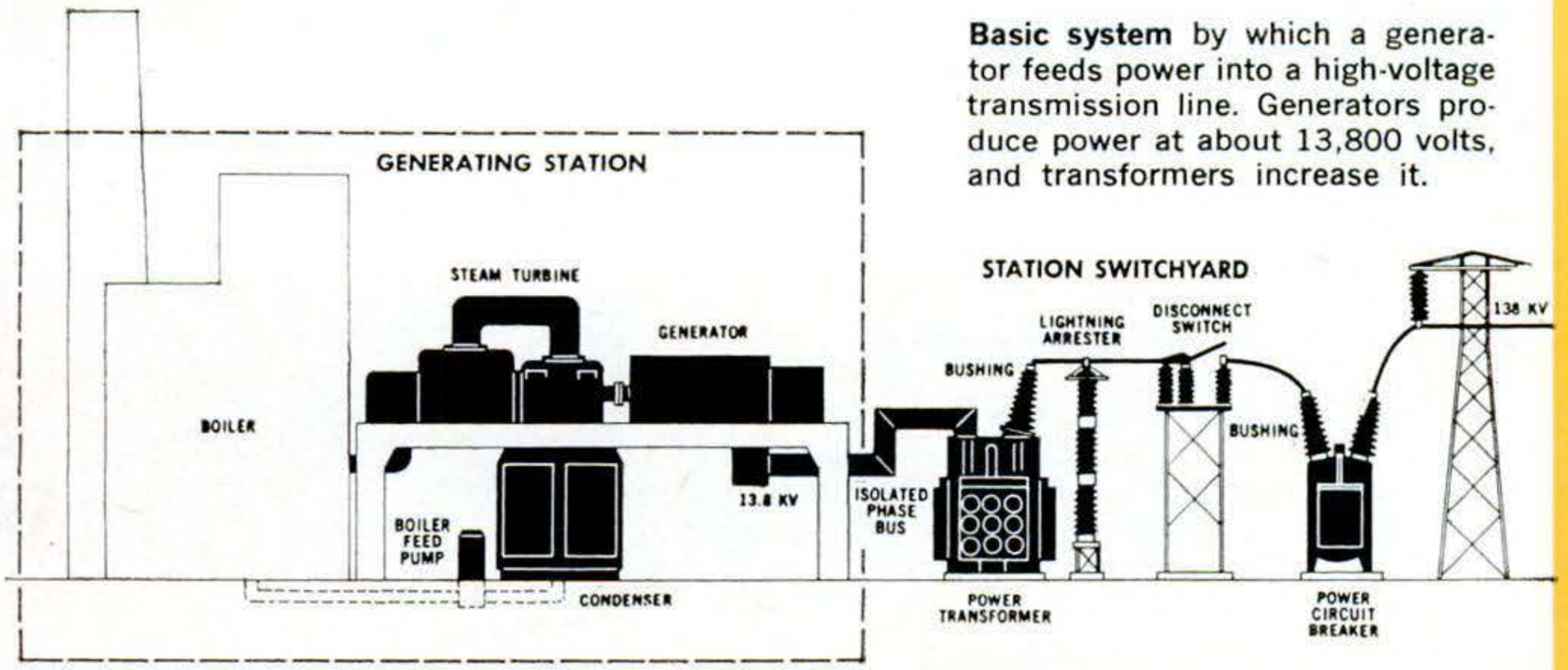
CANADA – U.S. EASTERN INTERCONNECTION

PENN.-N. J.-MD. INTERCONNECTION

INTERCONNECTED SYSTEMS GROUP

NORTHWEST TEXAS-EASTERN NEW MEXICO

TEXAS INTERCONNECTION



Basic system by which a generator feeds power into a high-voltage transmission line. Generators produce power at about 13,800 volts, and transformers increase it.

Copyrighted material

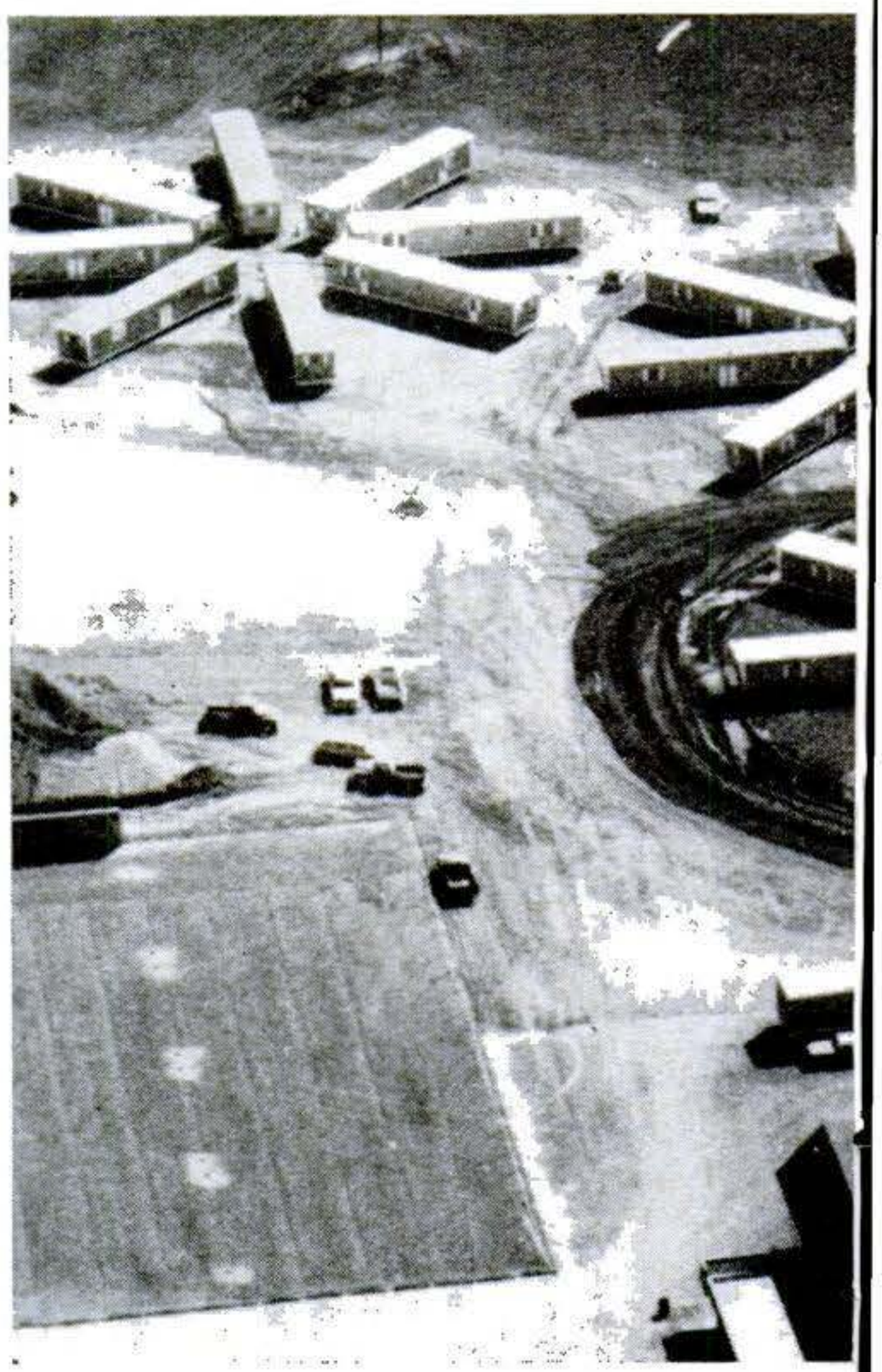
Huge parachute brakes streaming behind, delta-winged craft slows to stop after setting record-breaking speed three times faster than sound.

Leaping from takeoff at Edwards Air Force Base, Calif., to altitude of 70,000 feet, supersonic XB-70A research bomber starts on record flight.

Start and finish

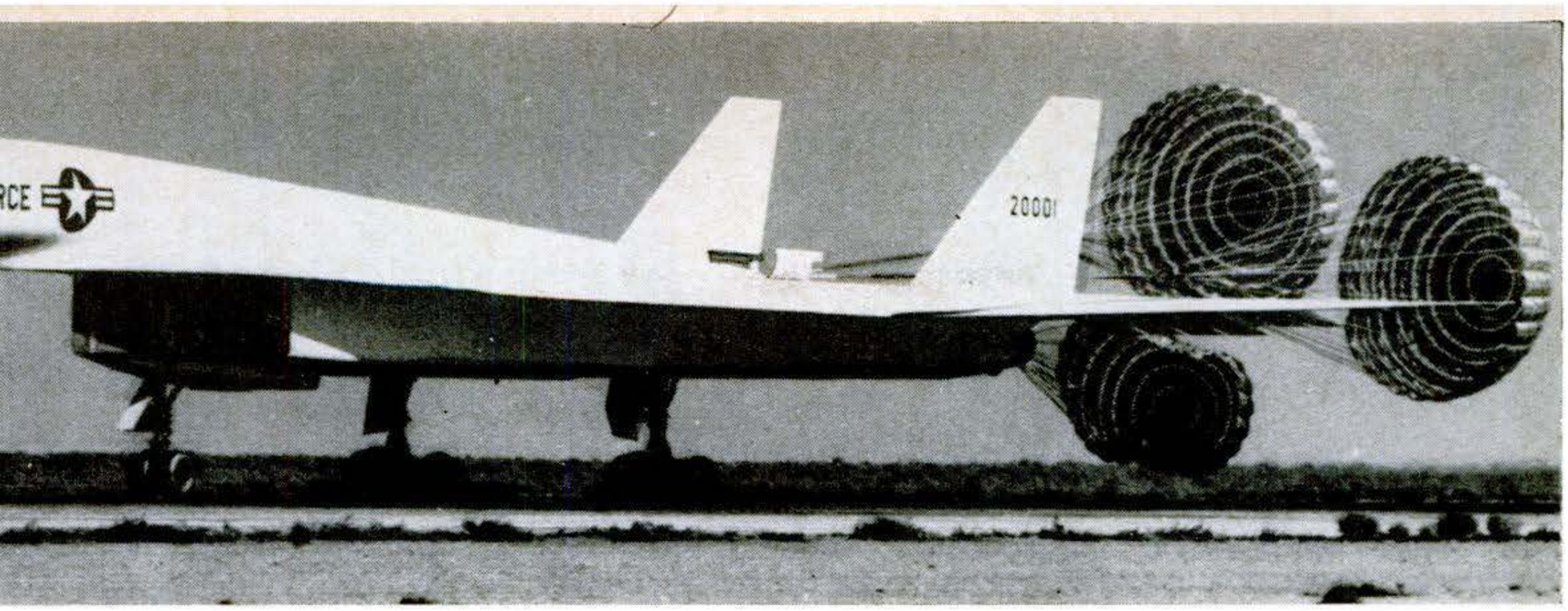
Bike-pedal light for accident prevention

Flashlights built into bicycle pedals will warn motorists at night that a bike is on the road and help prevent an accident. Tubing, instead of rods, in the rubber treads houses batteries to power the lamps—red on one side, white on the other—shining through translucent pedal panels (inset). Pedalites, made by American Safety Equipment Corp., 121 Madison Ave., NYC, are shown in a photographic time exposure (above) as they appear in the dark—highly visible wavy streaks of light.



California university has star-studded campus

Copyrighted material

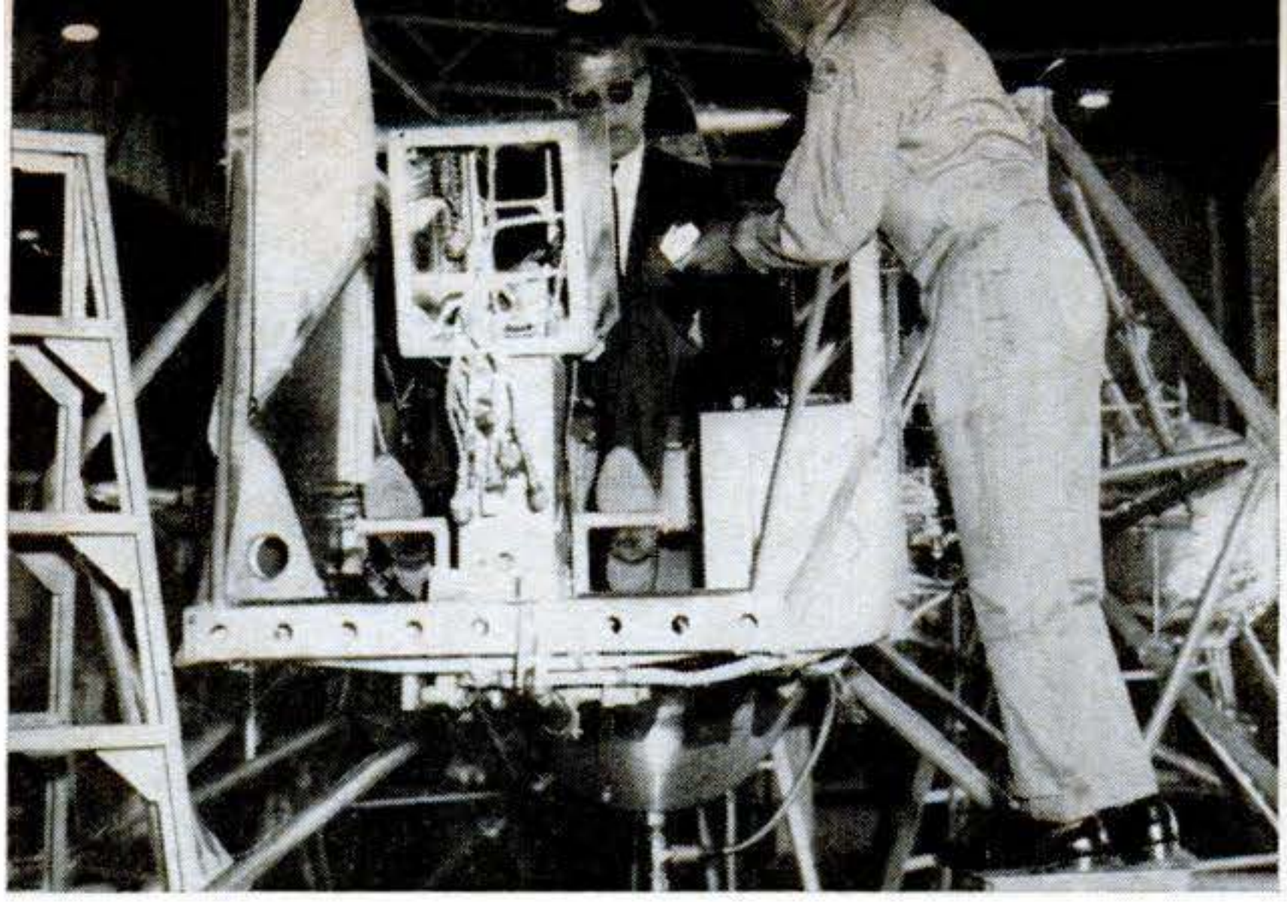


of record-breaking flight three times faster than sound

The Air Force's XB-70A research bomber built to fly faster than the speed of sound [PS, Dec. '64] has achieved that mark spectacularly. On a flight crossing five states in an hour and 47 minutes, the 2,225-ton North American plane reached an altitude of 70,000 feet, maintained a 2,000-m.p.h. speed (three times that of sound) for two minutes, flew above Mach 2 for 46 minutes, above Mach 1 for 70 minutes. Each of its six jet engines produce a thrust of more than 30,000 pounds, generating power equal to 1,000 automobiles of 200 hp.

Eight star-shaped clusters of house trailers make temporary dormitories at the new University of California-Santa Cruz. Arranged in groups of eight trailers each, the units provide housing for the first 356 students on the campus until permanent buildings are constructed. The field house at lower left in the photo serves as their temporary dining hall.

Copyrighted material



Practicing

Seated at controls of LLRV, Dr. von Braun is shown how they work by Joseph A. Walker, chief research pilot at NASA's Flight Research Center, who was first to fly craft.

By Dr. Wernher von Braun

Director of NASA's George C. Marshall Space Flight Center, Huntsville, Ala.

When a report in last November's PS on the LLRV rocket craft was written, the vehicle was still undergoing preliminary flight tests. Since then, these trials have been completed—and actual simulations of moon landings with the LLRV have begun. Here, Dr. von Braun brings up-to-date the story of the strange craft and its purpose.—THE EDITORS.

Long before our first Apollo astronauts descend from a lunar orbit to the moon's surface, they will have practiced this critical maneuver on earth. They will get their training with a strange-looking flying machine called the Lunar Landing Research Vehicle, or LLRV, designed to simulate an Apollo landing on the moon.

Two of these craft were delivered in the spring of 1964 to NASA's Flight Research Center at Edwards Air Force Base, 80 miles north of Los Angeles and right in the heart of the Mojave Desert—a site resembling the moon's barren landscape. By late last year, preliminary flight trials of the vehicles and their equipment were successfully concluded. Now the LLRVs have begun fulfilling their purpose—to help engineers and astronauts familiarize themselves with the down-to-earth problems of putting a manned vehicle down on the moon.

The lunar landing. Since an LLRV is to simulate a lunar landing, let us first examine the tasks it is to duplicate:

In Project Apollo, two of the three astronauts, while in orbit around the moon, will transfer from their capsule, or Command Module, to the Lunar Excursion Module, or LEM. The LEM in essence is a two-stage rocket craft. As it descends from lunar orbit under the power of its throttlable first-stage engine, the horizontal velocity is gradually reduced. At a few hundred feet above the moon surface, the LEM is to hover motionless, while the astronauts select a suitable landing spot.

The touchdown maneuver itself resembles that of a helicopter, with the rocket engines' "thrust-control" lever replacing the chopper's "collective-pitch-control" lever. Shock-absorbing struts on the four legs of the spiderlike landing gear are to take care of the first contact, hopefully soft, with the lunar soil.

The return trip from the moon's surface to the orbiting Command Module uses the rocket power of the LEM's second stage. The pressurized flight-crew compartment, which has served as the flight deck during the descent under first-stage power, forms a part of the second stage.

The LLRV's task. The Lunar Landing Research Vehicle must do these things:

- Simulate as realistically as possible the terminal portion of the LEM's descent from orbit—say, from 1,000-foot altitude and 40-m.p.h. horizontal speed down to contact with the lunar surface.
- Allow for the moon's weak gravitational pull, only about ⅙ that of earth.
- Take into account the moon's lack of an atmosphere.
- Simulate the initial part of the ascent of the LEM's second stage from the moon.

Copyrighted material

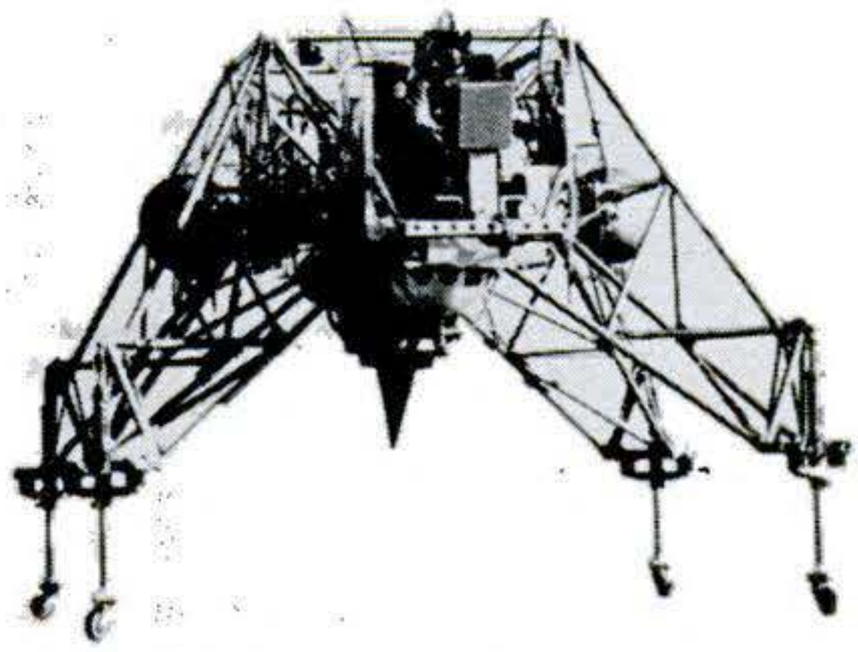
Flights with a strange rocket-powered craft are showing how our astronauts will touch down safely on the lunar surface

a Moon Landing on Earth

Descent of LEM to moon's surface, above, is simulated by the Lunar Landing Research Vehicle.

- Permit simulation of an "aborted landing" on the moon. If the astronauts decided, a few seconds before touchdown, that the selected terrain did not look suitable for a safe landing attempt, plans would call for immediate return to the orbiting Command Module.
- Provide maximum safety for trainees and vehicles. Specifically, have adequate redundancy so that no failure of a single part could cause a disastrous crash. Also, provide safe bail-out or ejection for the pilot, from all altitudes down to zero.

[Continued on page 224]

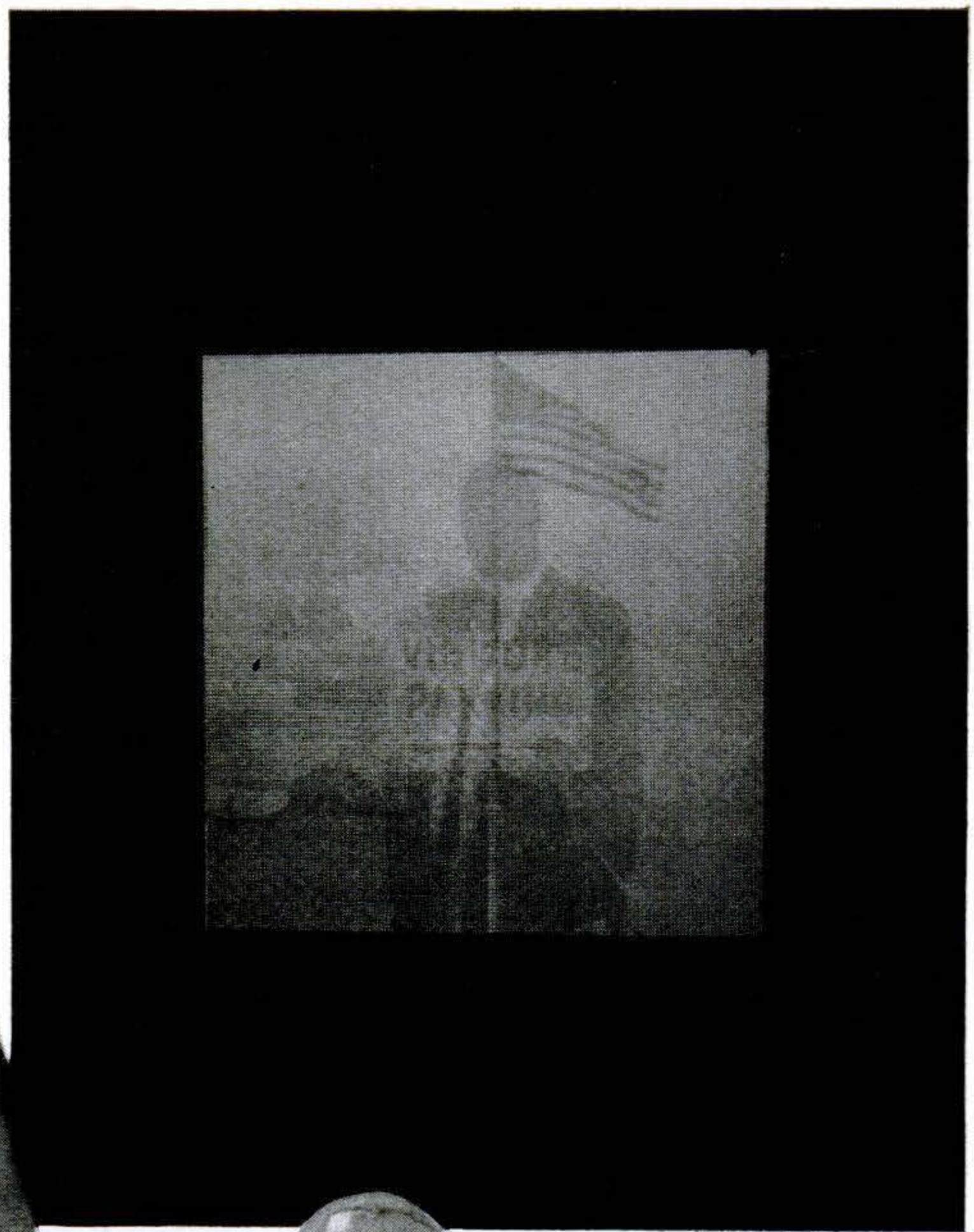


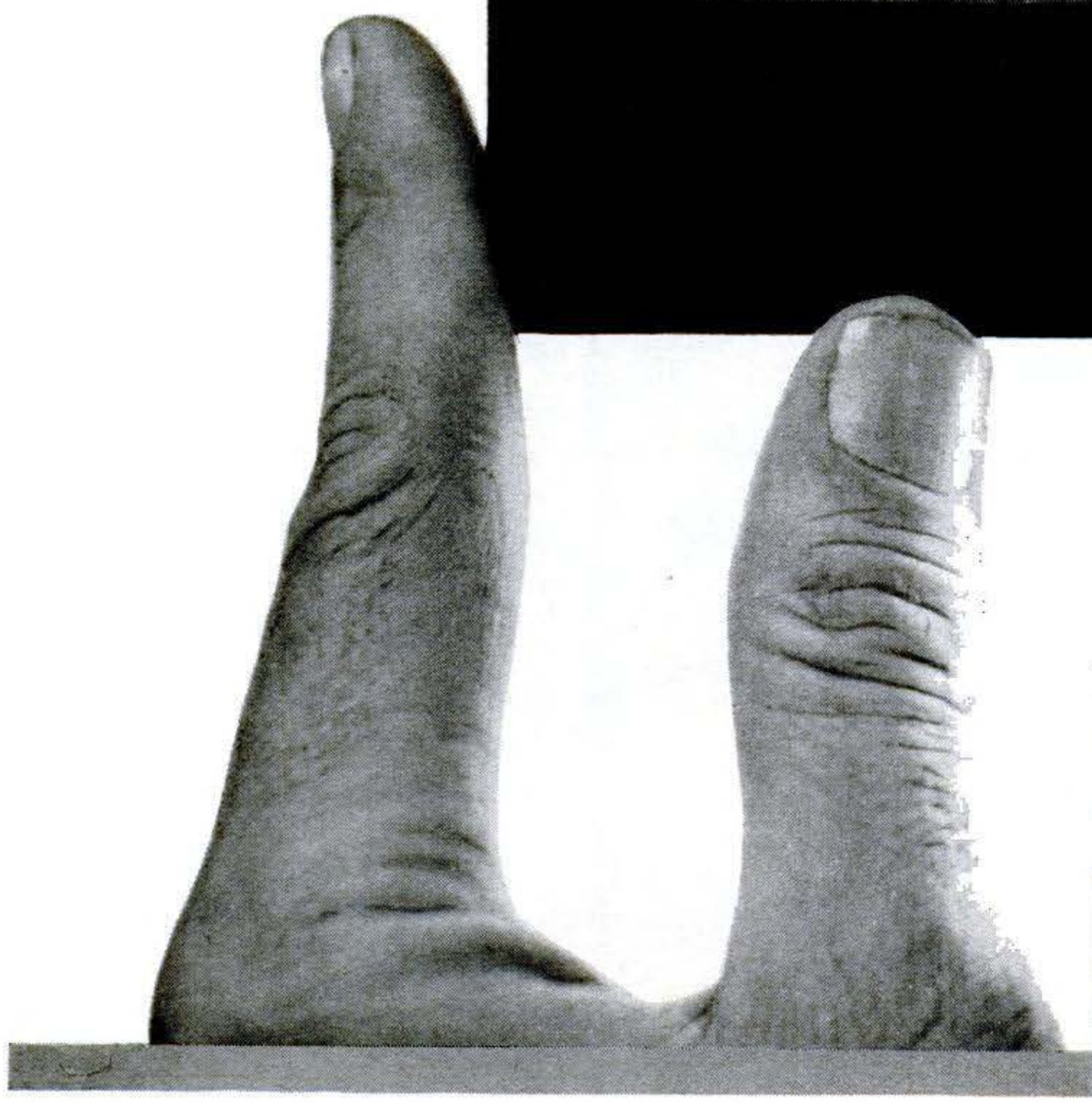
Pictured in flight, LLRV maneuvers above California desert during one of its preliminary trials.

Copyrighted material

PS EXCLUSIVE!

Here, for the first time anywhere, is the inside story of an amazing new development—one that promises to revolutionize photography and all other methods of visual communication





The photographic plate above, one of the first made using Multiplex Recording Photography, contains a dozen high-quality positive images, all of which can be separated with the simple camera/projector used to take them. At right, Clayton W. Houghton of Aeroflex Laboratories, inventor of the new photographic technique, examines a multi-exposure plate. His inspiration? A child's mechanical toy.

Copyrighted material

Taking 250 Pictures on One Negative!

By W. STEVENSON BACON

A year or two from now you may own one of the most fantastic little cameras ever held in a man's hand. Into the back you'll slip one photographic plate—a standard silver emulsion on glass instead of on cellulose acetate. On that one glass plate you will take up to 250 pictures in any kind of light, selecting color or black and white with the push of a lever.

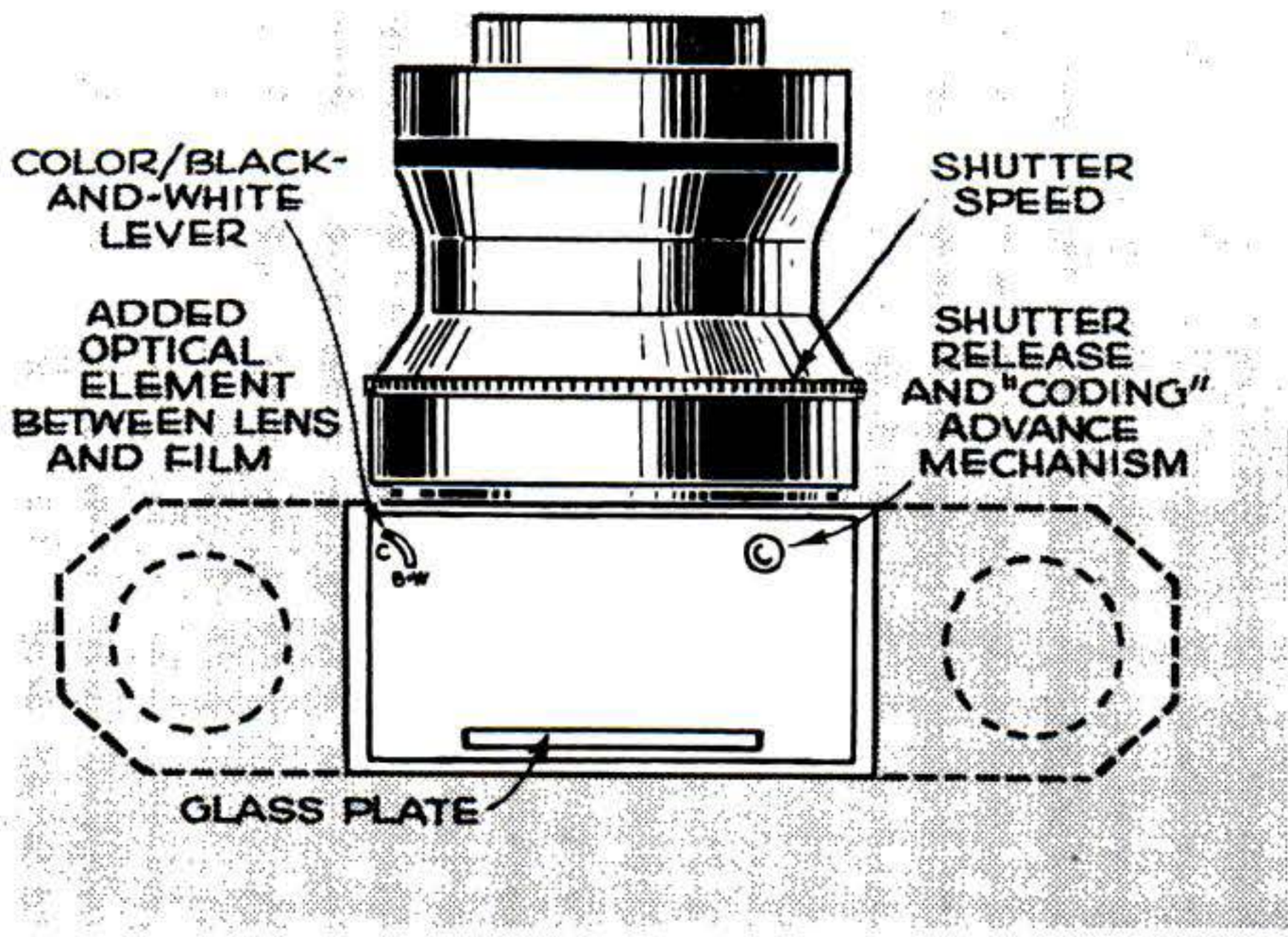
Let's suppose you first take a picture, in the store, of the clerk who sold you the plate for less than a dollar. Then you wander out on the street, snapping pictures of passersby, cars, buildings. Back home, you shoot pictures of the family, using available light. Dinner is by candlelight, but that's no problem—you just cut down the shutter speed. The next day on a scenic drive along a river, you press the color button and continue shooting until—at long last—*you have recorded a variety of 250 black-and-white and color photos on that one photographic plate.*

The next step is to take the plate to the drugstore for standard black-and-white processing (at a cost of about a quarter) or process it yourself, using a couple of large ashtrays and the small packs of chemicals that came with the plate. If the plate you purchased was the positive-reversal type, you give it the special processing required to reverse the images. Next, you attach a small light box to your camera, re-insert the plate, and begin projecting the 250 images—one at a time—through the camera lens onto a small screen in color or black and white.

Impossible? Not on your life. I saw the breadboard prototype of such a camera at Aeroflex Laboratories, Plainview, N.Y. I watched with amazement while the inventor, Clayton W. Houghton, flashed picture after picture on a ground-glass screen from a single positive-reversal photographic plate. Then he took the projector apart to show me there were no tricks—just that one emulsion-coated piece of glass.

Houghton, who is manager of Aeroflex's Reconnaissance Division, was watching his daughter play with a mechanical toy one day last March when the idea came to him—an idea that he claims is "simple in the extreme and makes better utilization of already-known laws of physics, chemistry, and photography." To test his idea, he bought a $3 Brownie camera, modified it with Scotch tape, took an afternoon off, and snapped 50 pictures

[Continued on page 228]



How a 35mm camera might look, redesigned for MRP, is shown in the drawing at left. All film-winding mechanisms and film-storage space (dotted lines) would be eliminated, as would lens diaphragm. An additional optical element, the details of which are secret, would be placed between lens and emulsion-coated glass plate.

Copyrighted material

Synchronizer Mates Slide Projector

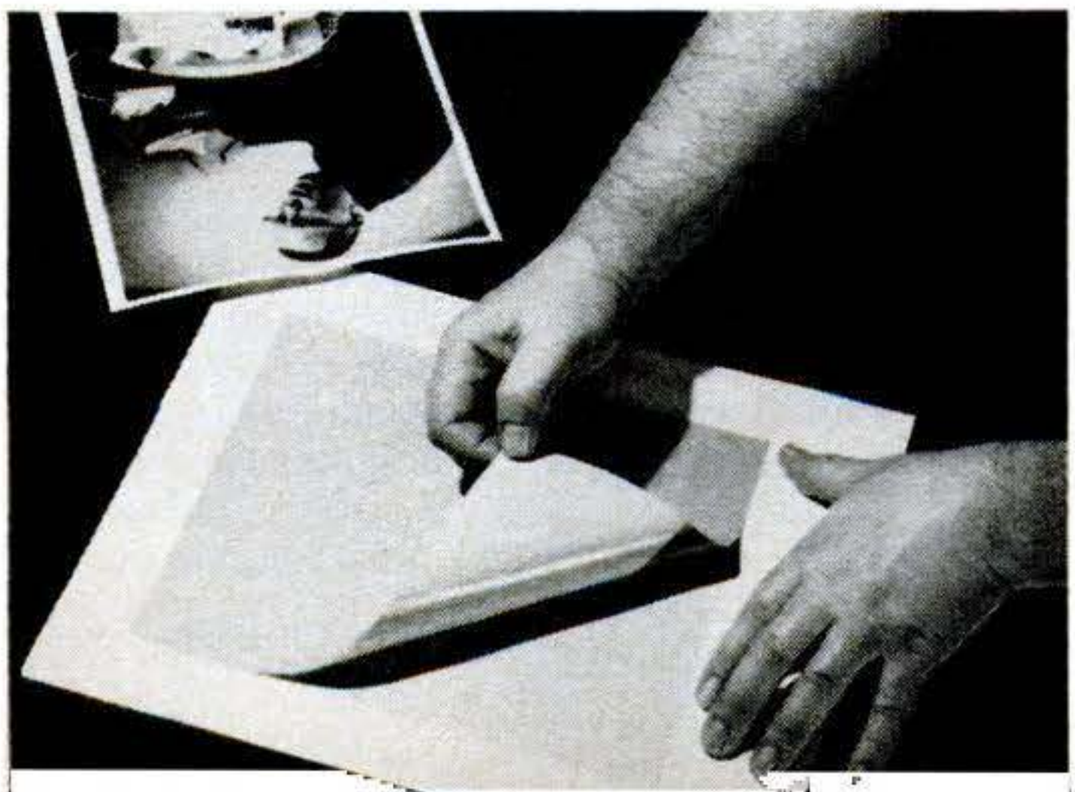
Want to sit back and enjoy (or sleep through) your own slide show? With the new Kodak Sound Synchronizer connecting your stereo tape recorder to a Carousel 700, 800, or AV-900 projector, you can. You plug one cord of the synchronizer into the projector, the other cord into the tape recorder. Then plug the projector remote-control cord into the synchronizer. Turn on the projector and recorder. Start talking, changing slides as you go. Every time you change

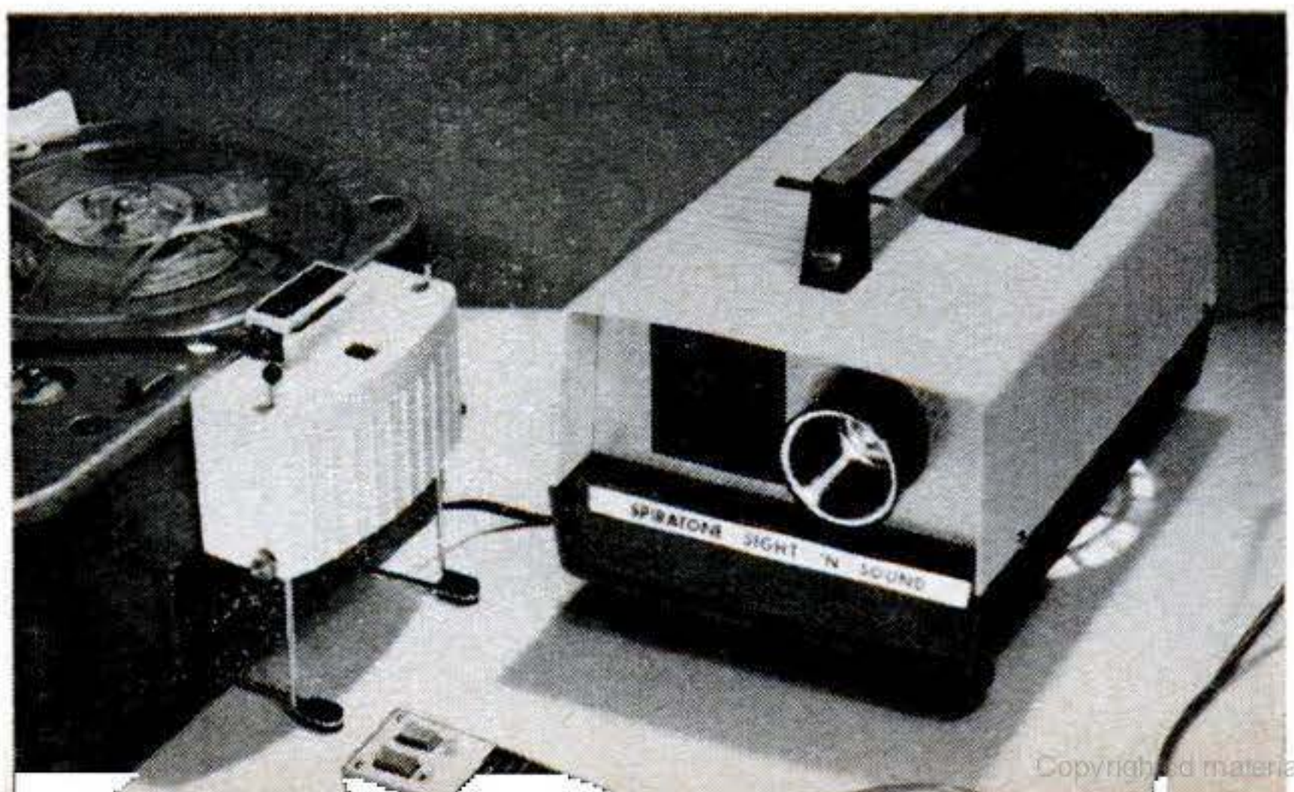
Two-sided stickum for mounting photos

No heat or pressure is needed to mount pictures with a new two-sided stickum called Minit Mount. Peel off one backing sheet and put the stuff on your board. Peel off the other sheet and position your photo on the stickum. Ten 8-by-10 sheets cost $2. Blain-Whitted Graphics, 2447 N. Ashland Ave., Chicago 60614.

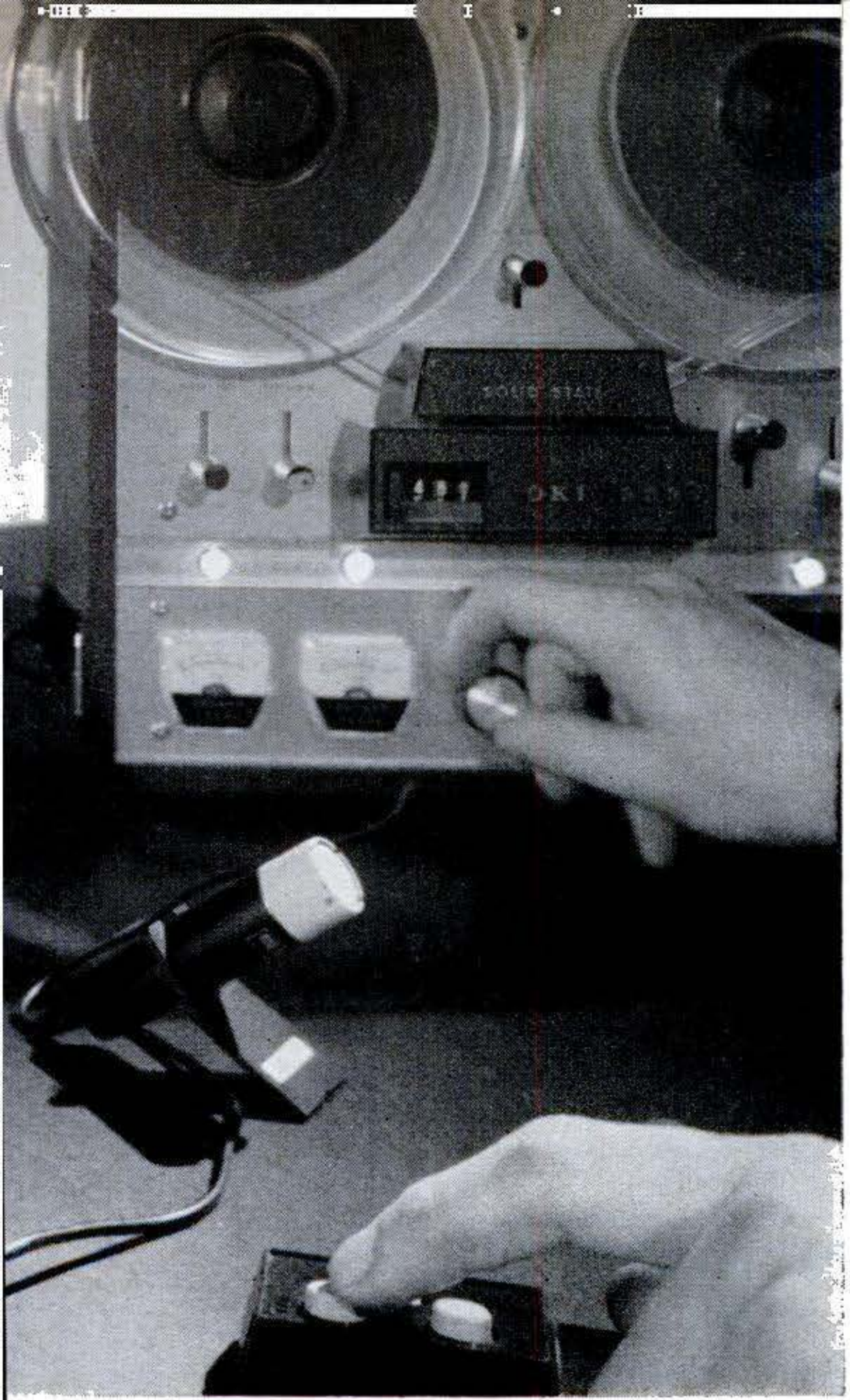
Package deal gives pictures and spiel

A 300-watt automatic projector with remote control, plus a sound synchronizer that lets you use your tape recorder to both deliver the spiel and change the slides, make a bargain package that sells for $99.95. Called Sight 'n Sound, the combination is sold by Spiratone, 135-06 Northern Blvd., Flushing, N.Y. 11354.



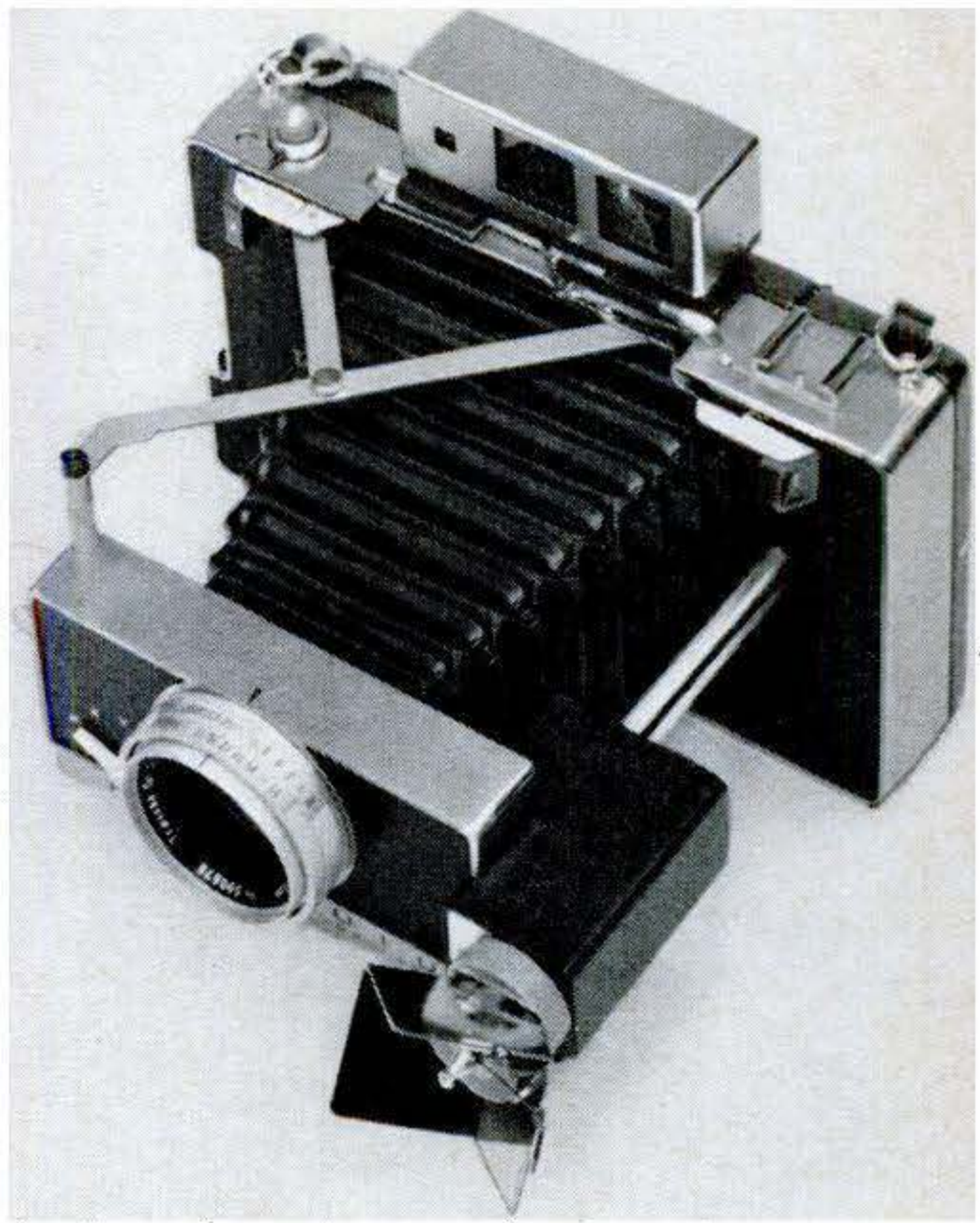


Copyrighted material



and Recorder

a slide, the synchronizer puts an inaudible signal on the tape. Play the tape back and the system does the work this time, delivering your speech and automatically changing slides at the right moment. Cost: $29.50



A new Polaroid and a revolutionary flash

Designed for professional photographers, the Polaroid 180 Land Camera has lens openings from *f*/4.5 down to *f*/90, shutter speeds from a second to 1/500, and uses Polaroid pack film to produce 3¼-by-4¼-inch prints. The flashgun is revolutionary in its simplicity. As you focus the camera, the bulb moves in and out of its reflector, varying the brightness of light on the subject. Camera: $189.95. Flash: $13.95.

Battery-powered safelight

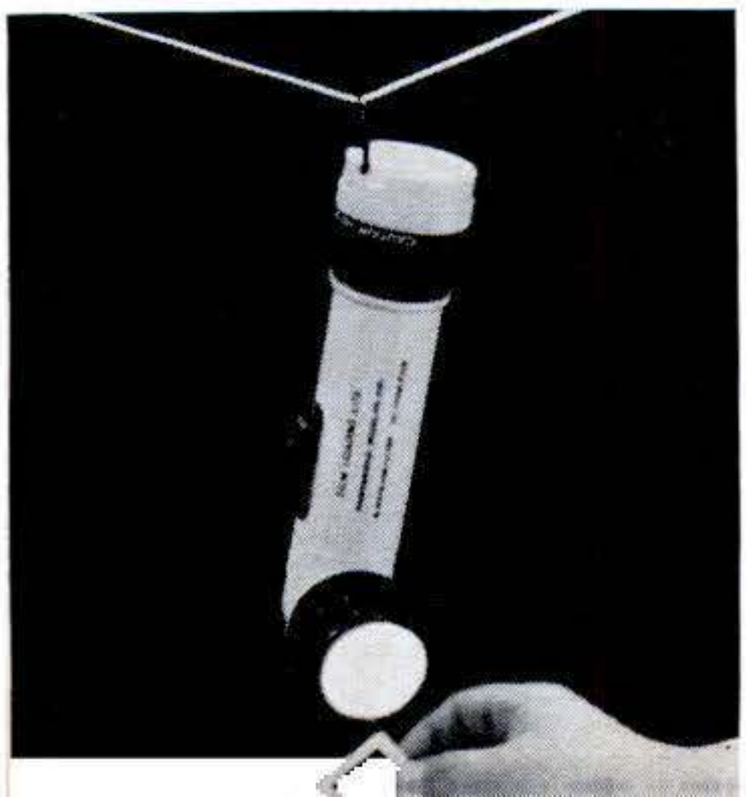
Film Loading Lite, made by Bright Star, comes with green and red filters to save fumbling when developing film, and an orange filter that turns it into a supplementary darkroom safelight (below). Cost: $6.95.

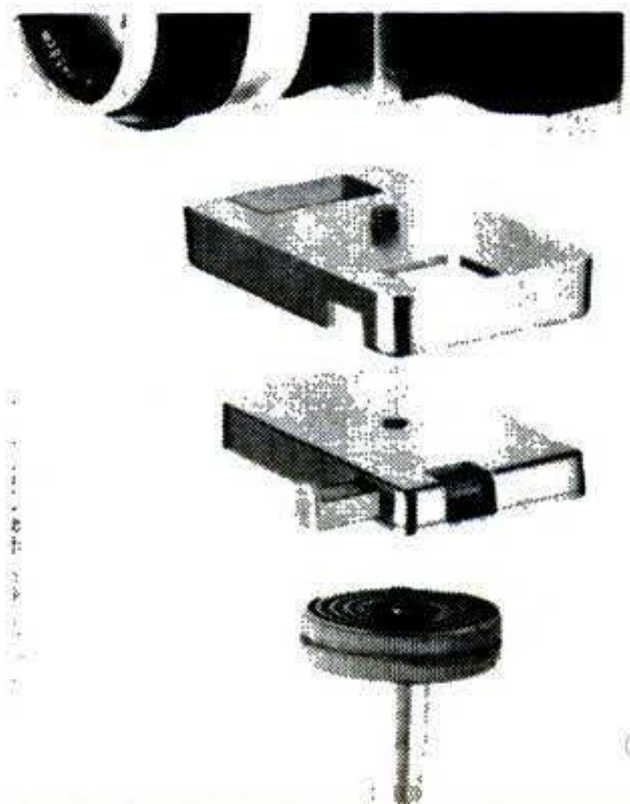
New Super 8 Minolta

Designed to take Super 8 cartridges, the Minolta Autopak-8 K5 has through-the-lens viewing and exposure control, manual zoom (9.5mm to 30mm), electric film drive. Price: $189.50.

Instant tripod release

Improved Tri-Lock quick-release device helps you slip a camera on or off a tripod instantly. Its two parts, one on camera, one on tripod, lock by spring action. $9.95. Tri-Lock, Box 650, Whittier, Calif.





Copyrighted material

Dick Smothers (in cap) inspects engine of brother Tom's reconditioned 1940 Super-8 Packard.

SMOTHERS BROTHERS

Add zip to your road life. Take a spin with the TV stars who are bugs for motor sports

By WESLEY S. GRISWOLD

Two of today's brightest rising television stars—those brashly amusing young Smothers Brothers—are victims of the motorbike fever that's sweeping the country.

In Southern California, where they live, the fever has reached epidemic proportions. There are 100,000 registered motorbike owners in that part of the state alone, and an estimated 500,000 riders.

Tom Smothers, 29, is currently running a high temperature over a 650cc BSA with bell pipes. ("They reduce back pressure, but make an awful lot of noise. Still, I kinda like it," he says.) Dick, 28, wears a persistent flush of enthusiasm for a 600cc BMW with side hack.

Tom, whose TV role presents him as an inept angel trying to win his wings, felt the motorbike craze first but quickly had it knocked out of him—until recently.

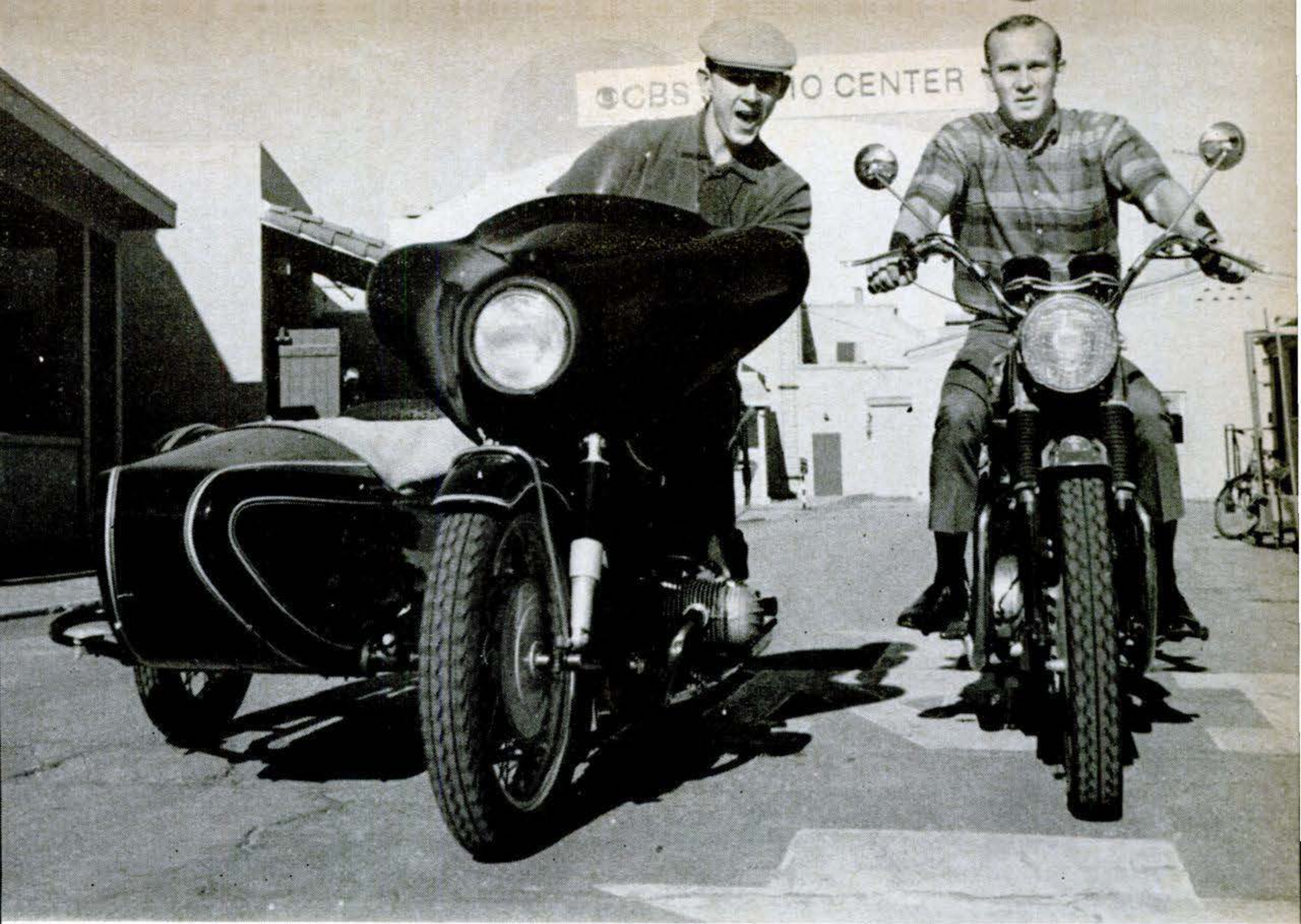
"When I was a kid," he says, "I once borrowed a friend's bike, drove it around a corner, pulled on the gas, and immediately ran into a wall."

Dick's enthusiasm for motorcycles began later but has grown steadily ever since.

The Smothers' present infatuation with motorbikes took hold about two years ago.

"We played in a coffeehouse, recording an album," Tom recalls. "They couldn't afford to pay us our regular fee, so we said,

Copyrighted material



Dick (left) and Tom head home after filming one of their TV segments at Los Angeles studio.

...crazy for wheels

'Why don't you buy us a couple of Honda 50s instead?' So they did, and we started riding them. They're real light and easy to handle and very handy for learning co-ordination, which I had to do. Besides, they're four-cycle engines, and don't make that foolish noise that the two-cycles do. But in about three days, we both wanted something bigger and faster. So we traded the 50s in for a couple of Honda 90s."

Thus began a rapid series of trades, typical of motorbike owners, involving an increasingly powerful succession of vehicles. Tom next acquired a 150cc Honda, which he gave to Dick when he spotted a 305, the biggest that the company made at the time.

"I had that Honda 305 for six or eight months, maybe a year," Tom said.

Dick is "happiest when I'm fooling around with something mechanical. That's just the way I think—everything mechanical I dig. Anything that works or ticks or tocks, I want to fix, and it interests me.

"Don't get the idea that I'm an ace mechanic, though. I couldn't really tune a highly sensitive sports-car engine, but I like to mess around with my bike and my cars. I regularly adjust the valves on the bike, and can locate and fix any ordinary ailment on both it and the cars."

He's also a bear for neatness. The engine compartment of his seven-year-old Aston-Martin could pass a white-glove inspection.

Tom's pleasure in motorbikes is more aesthetic than mechanical.

"People in cars don't see you." "What I enjoy," he says, "is being close to the road and having the wind in my face, and when

Continued

Copyrighted material

Dick Smothers holds the higher-gear rear end that he installs on his BMW when he wants to leave the sidecar home. It hooks onto the drive shaft at the right of the motorbike's rear wheels. He carries a spare tire on the rear deck of the sidecar. Dick does all his own work on bikes, but brother Tom admits he will never fix his motorbike himself.

I take a trip somewhere—you know, just a joyride—there's nothing between me and the countryside. It's exhilarating. The biggest problem is that people in cars don't see you, and you've always got to drive like they're out to get you."

His 650cc BSA, which cost $1,275, has double the power of the biggest Honda he owned.

"It has a tremendous bite," he says. "I've done 95 on it. But I feel safer on it than on the earlier bikes. The wind buffeting doesn't matter as much as it did before. I've got more under me. The braking is stronger, with more wheel touching the ground. It's a heavier, smoother machine than my Honda 305, which had a great deal of vibration. The Honda derived its power primarily from high r.p.m., from the revving, and after awhile you get a little shaky from those r.p.m. The bigger bikes, like my present one, have a lot of torque, and you can hold a higher gear lower down. You're not always revving up and shifting."

Dick's 600cc BMW is considered a Cadillac among motorcycles. It has opposed cylinders, like a Volkswagen, and a driveshaft instead of a chain. He keeps the sidecar on most of the time now.

"It's a difficult trick driving with a sidecar," commented Tom. "You have to drive it quite a bit to get used to it. Whenever you're accelerating or braking, you have to compensate with your handlebars for the forward movement or slowing down of the sidecar. And it's easy to forget that there's something over there on the side when you're just driving along and steering. But Dick can handle it pretty well. His wife gets bugged, though, because he's always wanting to take her out some place in it."

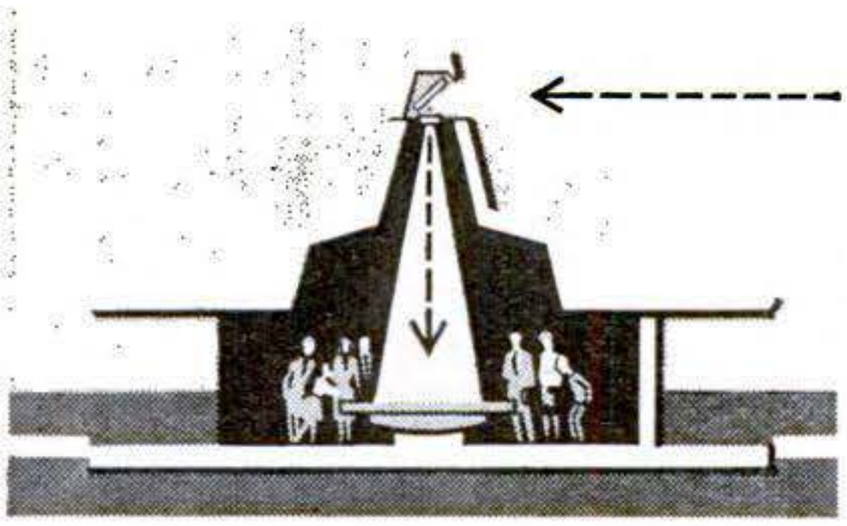
"Linda says that every time she gets her hair done, I suggest we go on the motorcycle," reports Dick. "I have a top and a windshield for the sidecar, but it's pure claustrophobia. There are no windows, only the windshield, and that's kinda smoked over."

Motorbike trailering. A few months ago, when the Smothers Brothers had a four-week engagement at the Flamingo, in Las Vegas, they and their young manager, Kenny Fritz, bought a three-bike trailer and hauled their motorcycles over there on it. Kenny's bike is a 250cc Yamaha. The Smothers boys had their present machines, but Dick left the sidecar home.

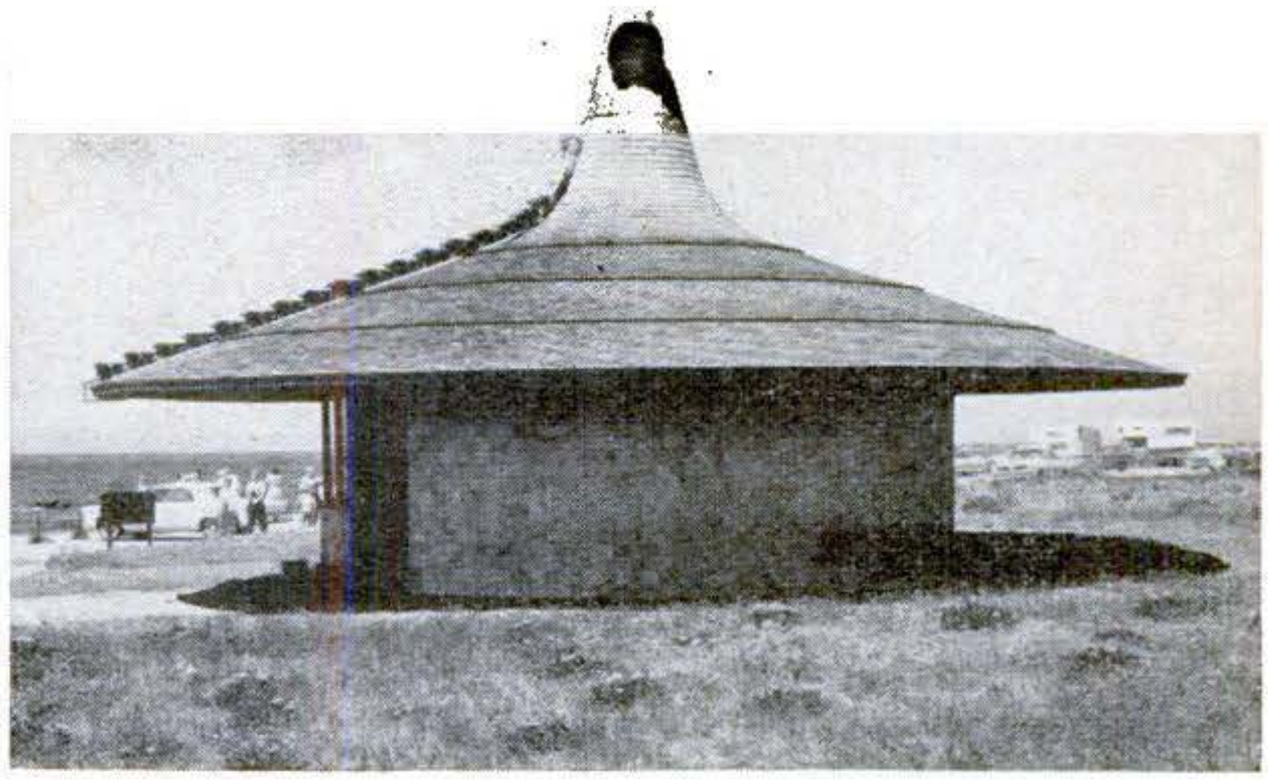
"We went on the dirt over there," Dick recalls. "It's desert all around, you know —all loose dirt—really a kick. I took one fine spill because I was going too fast. Another time, I was tearing down a dirt road near the Flamingo, and suddenly I see a big washout right in front of me. I slam on the brakes and slide almost over it—but only the front wheel clears it, and there's my bike hanging there. It wasn't a very deep gully, but all the weight was on the engine. I couldn't figure out how to get the thing out—the rear wheel was like locked in there. But I rocked and rocked, and finally sprang it loose. Light bikes are really the thing for dirt. A 90cc with a big sprocket is just great—a lot of power but a light bike. And you can't hurt yourself."

Early on, Tom had his Honda 305 set up for dirt, tried some hill climbing, and fell down, ruinously bending the bike. Says he: "I'm definitely not a hill man." PS

Copyrighted material



Rotating lens above aperture at peak of roof projects panoramic view on screen in dark interior of modern *camera obscura.*



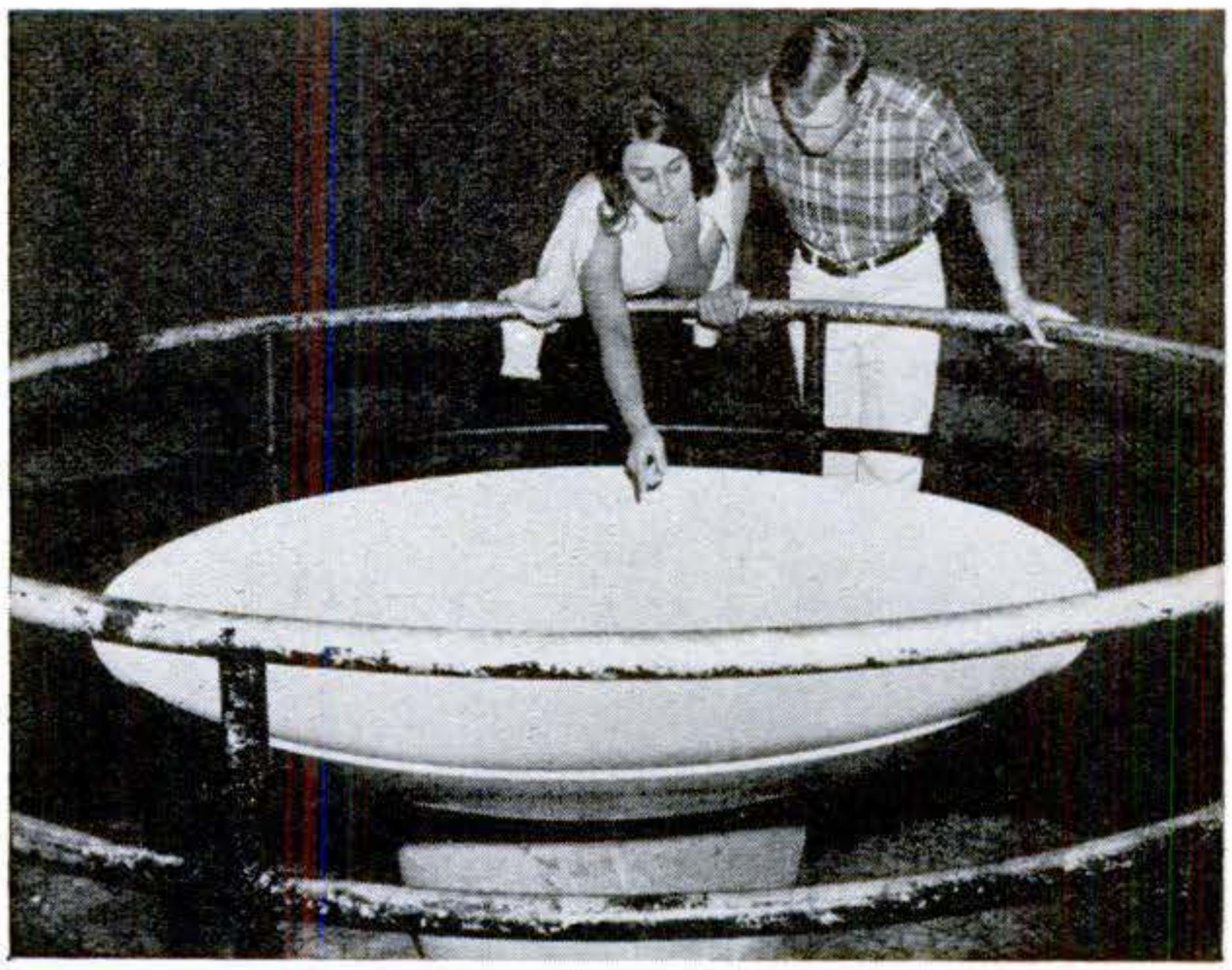
Circular tourist lookout picks up view along a scenic drive.

Highway lookout is a walk-in camera

Like the inside of a big box camera, this circular building on Monterey Peninsula's scenic Seventeen Mile Drive provides California sightseers with a continuous breathtaking view.

A rotating lens set in an aperture at the peak of the roof makes a complete revolution every eight minutes, projecting a full-color image of the surrounding scenery on a five-foot parabolic screen—a fiberglass bowl—below, at the center of a darkened 23-foot-diameter interior room.

The projector, a unique adaptation of an ancient device called the *camera obscura,* was built by Del Monte Properties Co., real-estate operators. Showings of the scenery are accompanied by a recorded commentary. There is no admission charge.



A fiberglass bowl provides a big parabolic projection screen.

British trailer rides on land or water

Back up to your favorite lake or river with the little Creighton Gull amphibious trailer shown below in tow, push it in, and you cruise off under power of an outboard motor at speeds up to seven knots. The sea-highway mobile home is 15 feet long, has a fiberglass hull and roof, and contains berths that can accommodate four adults. It can be launched with no trouble by one person. Made by Creighton Caravans, Lancashire, England.

Out of the water and on the highway, Gull trailer can be hitched up and towed by the family car.

As a cabin cruiser, with outboard mounted on its afterdeck, boat speeds along under its own power.

Copyrighted material

FRONT DRIVE IS GAINING FAST

By JAN P. NORBYE

"Go to Paris, London, and Turin," were my instructions. "See the auto shows, and drive as many of the new cars as you can—especially front-drive models."

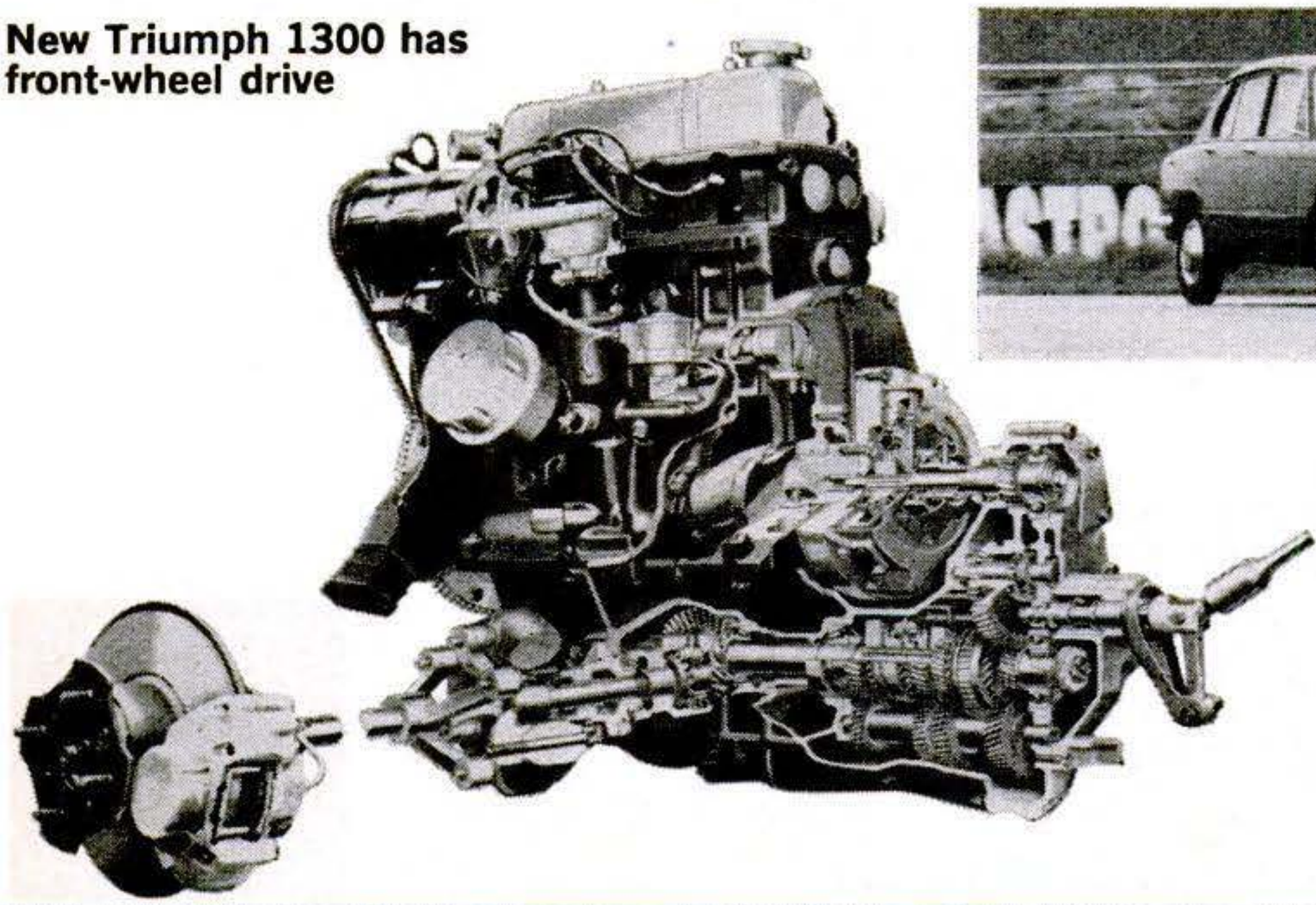
While I did just that, our Executive Editor put 10,000 miles on our own front-drive car, the Toronado [PS, Jan.]. Now we're both convinced of the merits of front drive for passenger cars of all sizes.

Auto makers in Europe obviously agree. This year, they'll turn out close to two million front-drive cars. One of the biggest manufacturers is getting ready to switch to front drive across the board—over 3,000 front-drive cars a day.

In my travels, I came across some eye-openers in European engineering originality. Three interesting highlights from my notebook:

- I drove a French front-drive car with disk brakes that flash a warning light on the dash when the pads get worn.
- I drove a 55-horsepower front-drive

New Triumph 1300 has front-wheel drive

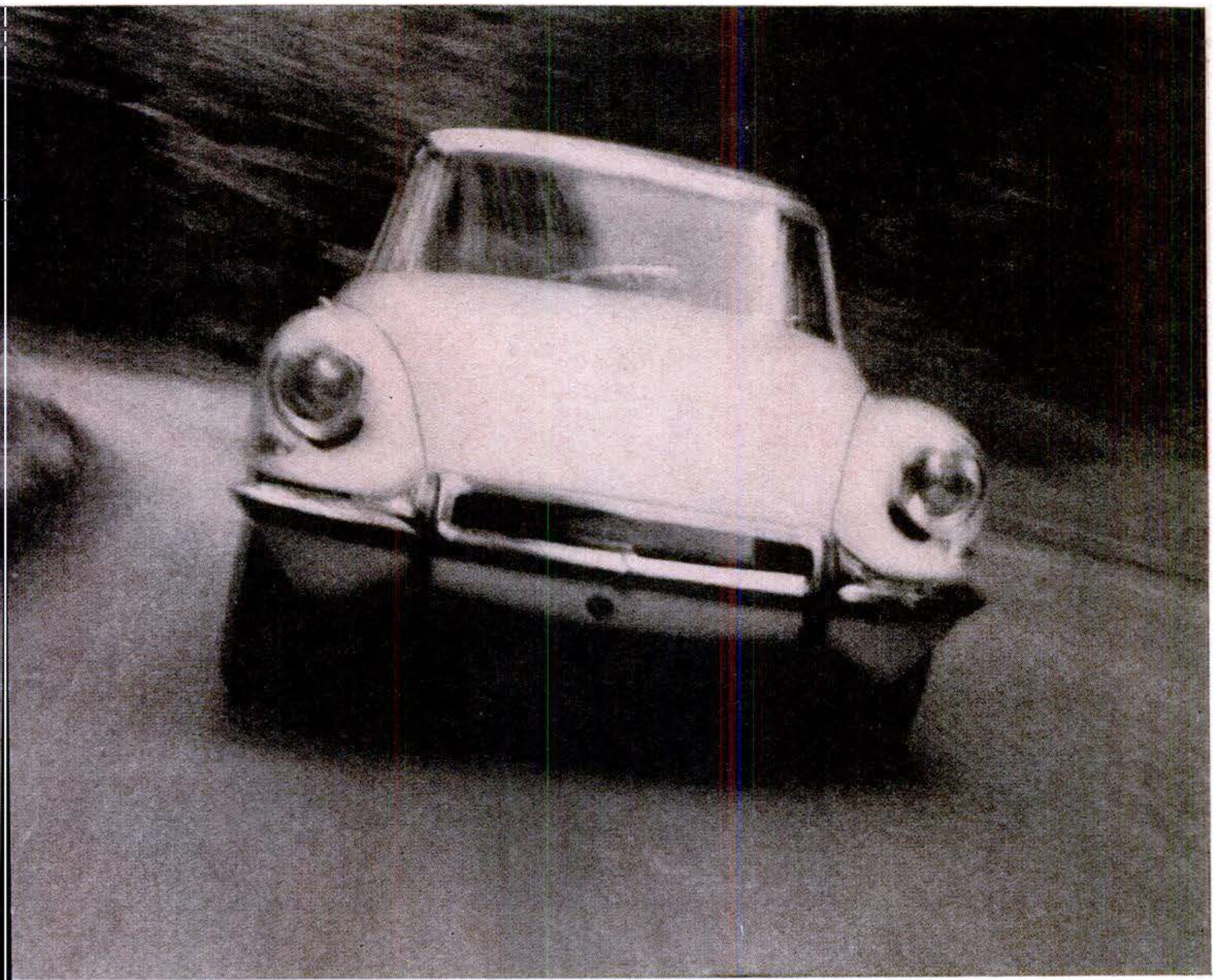


In-line four-cylinder engine is placed longitudinally in the vehicle, with a transaxle below the oil pan. This layout raises the engine's center of gravity but allows extremely large steering angles. The whole power train is carried in a rubber-mounted subframe for isolation of road noise and drive-train vibrations. Output of the 1300 is 61 horsepower at 5,000 r.p.m.

Copyrighted material

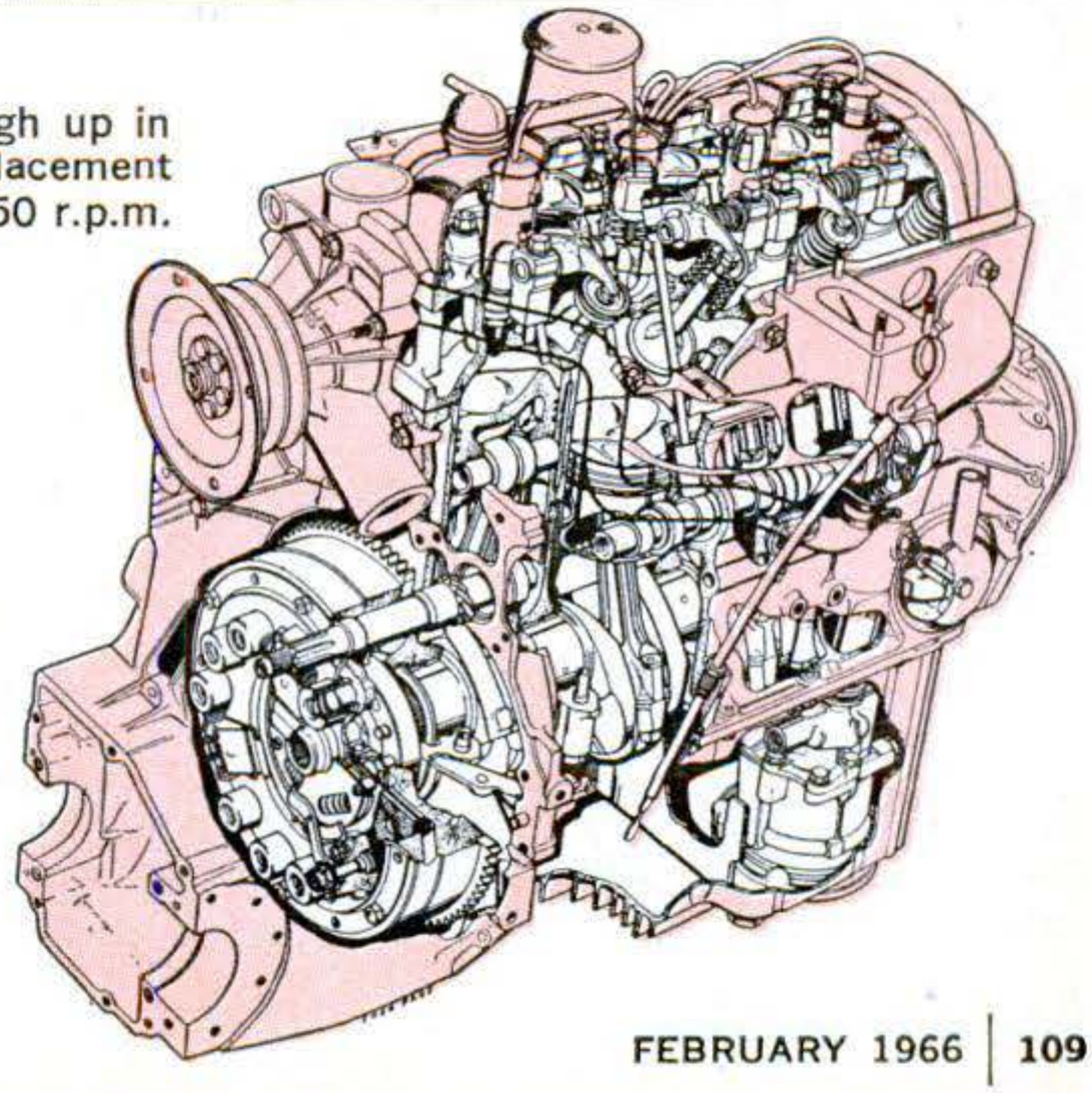
IN EUROPE

PS Auto Editor Norbye, just back from abroad, gives you the inside story on new designs and puts you behind the wheel of some exciting new cars



At last, Citroën offers a modern power plant

DS-21 engine has light-alloy hemihead, camshaft high up in block, short stroke, and five-bearing crankshaft. Displacement is 132.7 cu. in., power output 109 horsepower at 5,550 r.p.m.



sedan with automatic transmission. Automatic drives are available on most '66 cars, from the $1,595 Simca-1000 to the $14,960 Maserati Quattroporte.

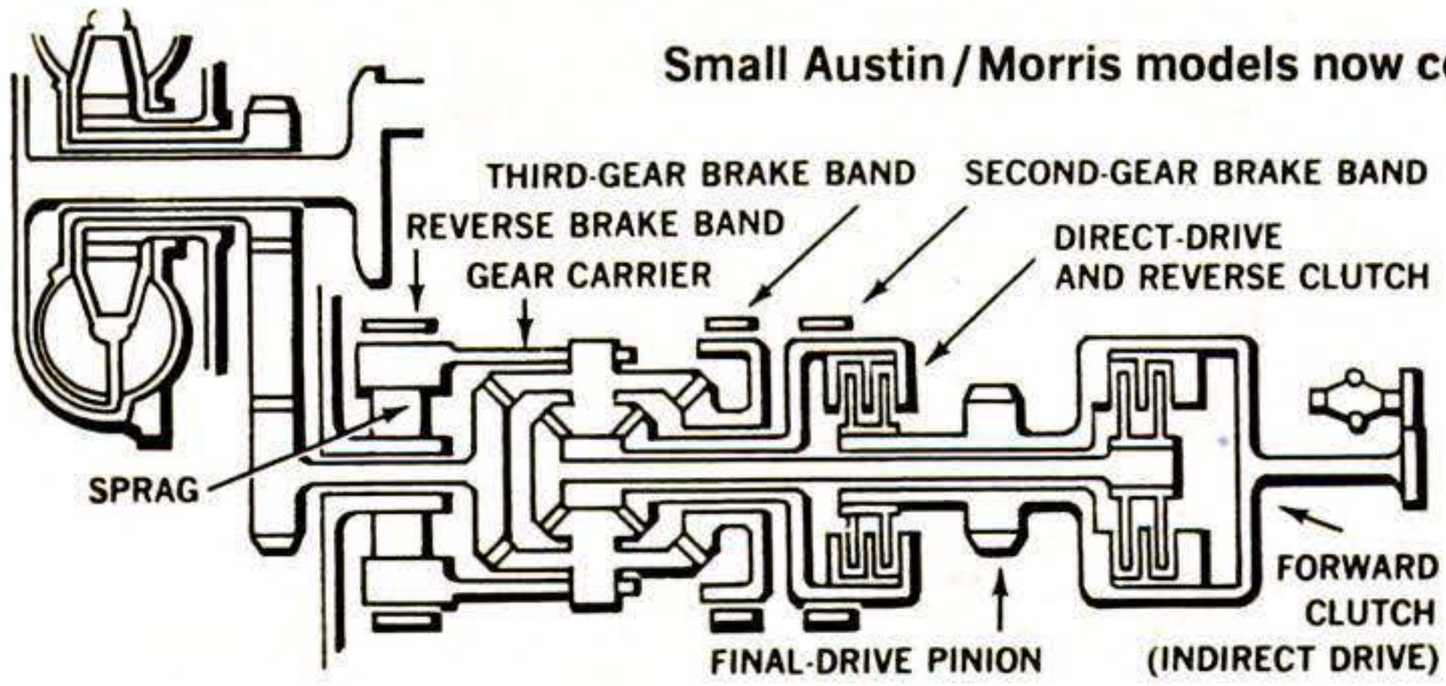
- I saw an Italian experimental car with a whopper-powered V-12 placed across the chassis behind the driver.

Sales are zooming, too. For the first time since about 1905, Europe has reached the point where their auto-production capacity exceeds our own.

Continued

Copyrighted material

Small Austin/Morris models now come with automatic transmission



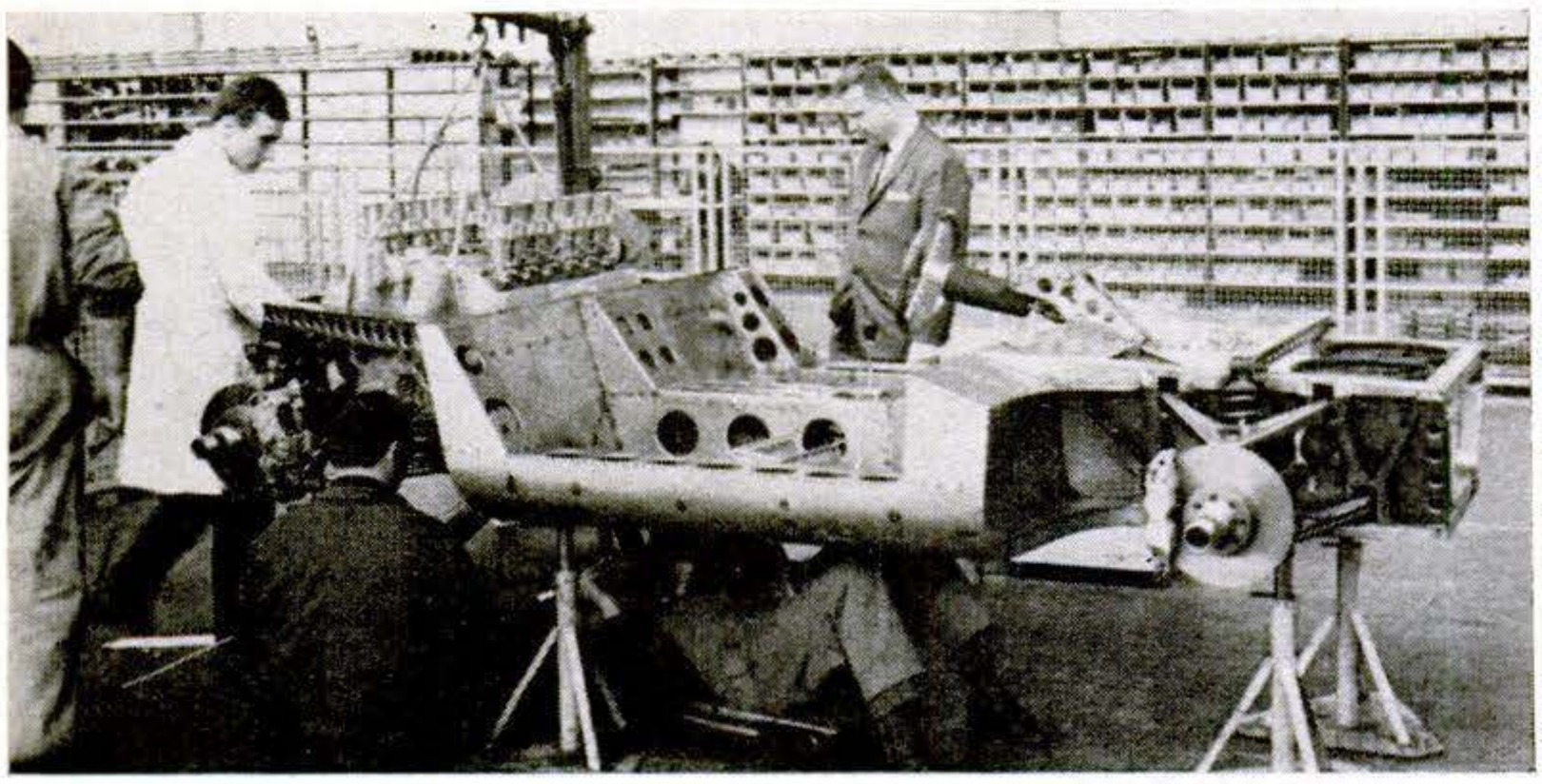
The torque converter is carried at one end of the transversely mounted engine. Its output shaft is coupled to a reduction gear coupled to a gear train consisting of two four-element differentials, one inside the other. Gear selection is accomplished by three brake bands, two multidisk clutches, and a one-way sprag. The whole unit is carried inside the oil pan.

And European cars are selling big in the U.S. Last year Americans bought over half a million foreign-made cars of 43 different makes, ranging in price from $1,295 to $31,700.

What's new at Citroën? For 10 years, the Paris works have been building some of the most beautifully engineered front-drive cars in the world. Their latest baby, the DS-21, is still 10 years ahead of its time. It's a driver's dream car, although dissenters call it a mechanic's nightmare. It has no springs, in the usual sense. The wheels are linked to containers with air and oil separated by a diaphragm. Cushioning, leveling, and damping are taken care of by a central hydraulic pump, which also supplies the power for the steering, brakes, clutch, and gearshift.

Since 1956, the Citroën has had twin master cylinders, front disk brakes (with a separate mechanical parking/emergency brake acting on the disks), and a brake-force distribution device to prevent the rear wheels from locking under hard braking. Now the disk-brake pads also have a feeler wire to tell when the pads are worn: A warning light on the dash comes on.

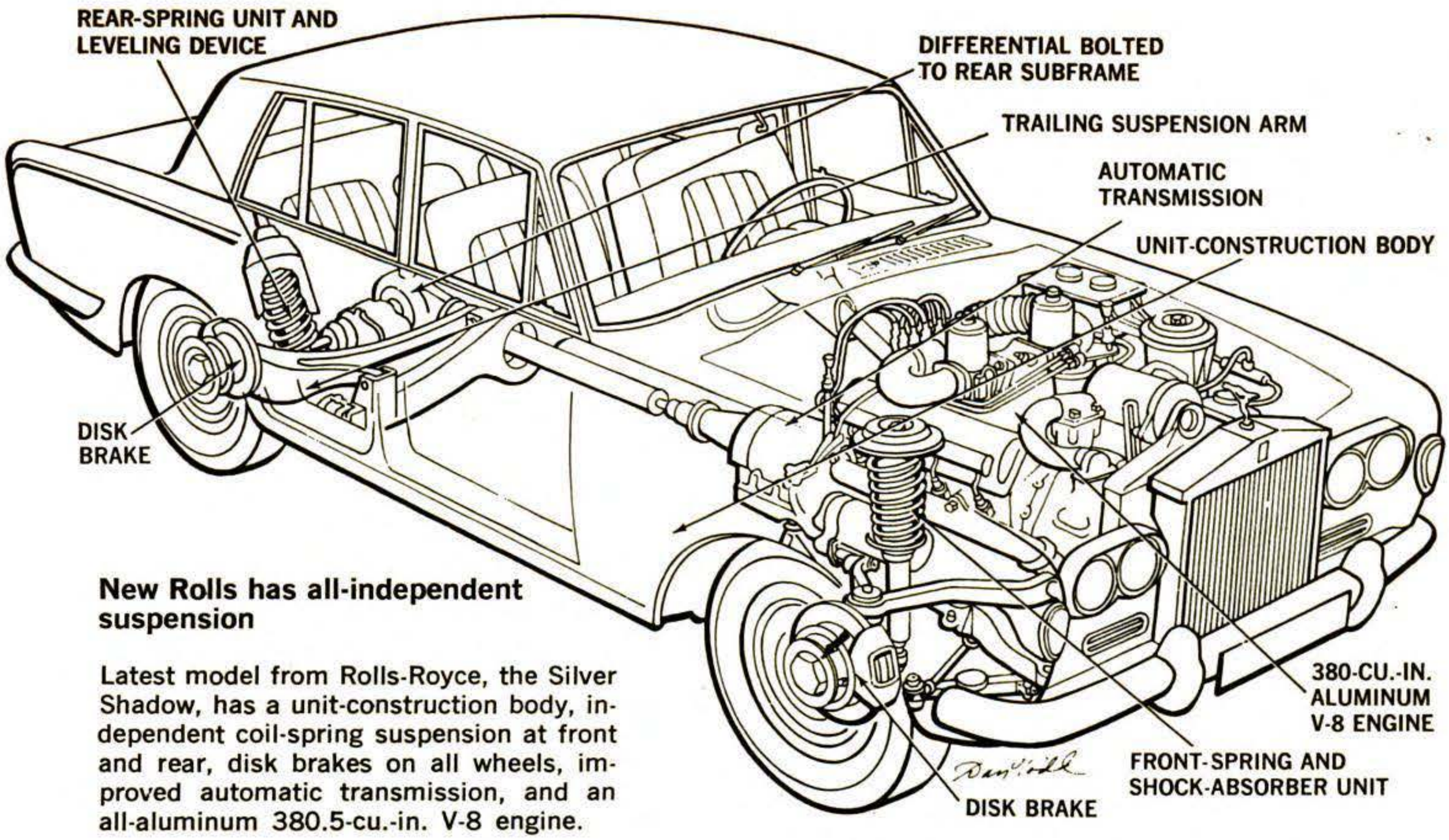
Some improvements in the DS-21 were long overdue. The inner joints in the front drive shafts used to be sliding pot-joints—they have been replaced by Citroën's own type of constant-velocity joint (similar to the Saginaw joints used on the Toronado). The result is complete elimination of the steering-wheel vibrations that used to set in on hard acceleration or braking, or in combination with large steering angles at speed.



Lamborghini P-400 has transverse V-12

Latest project from Italian tractor builder is a sports car with 430-hp. V-12 sitting across chassis just behind the driver. It has a three-plate clutch and five-speed transmission, both hydraulically operated. Body design is still on the drawing board.

Copyrighted material



New Rolls has all-independent suspension

Latest model from Rolls-Royce, the Silver Shadow, has a unit-construction body, independent coil-spring suspension at front and rear, disk brakes on all wheels, improved automatic transmission, and an all-aluminum 380.5-cu.-in. V-8 engine.

It's no dragster (standing quarter-mile times come out around 20 seconds), but it is good for 110 m.p.h.—with the same wonderful quietness the Toronado offers. The wind-cheating body is also the main reason for the Citroën's fuel economy. No matter how hard I drove it, I got almost 30 miles to the gallon.

In addition to all the refinements in the braking system, braking distances are marked on the speedometer dial. All in all, this must be one of the safest cars in the world. It sells in the U.S. for $3,795 (East Coast port of entry).

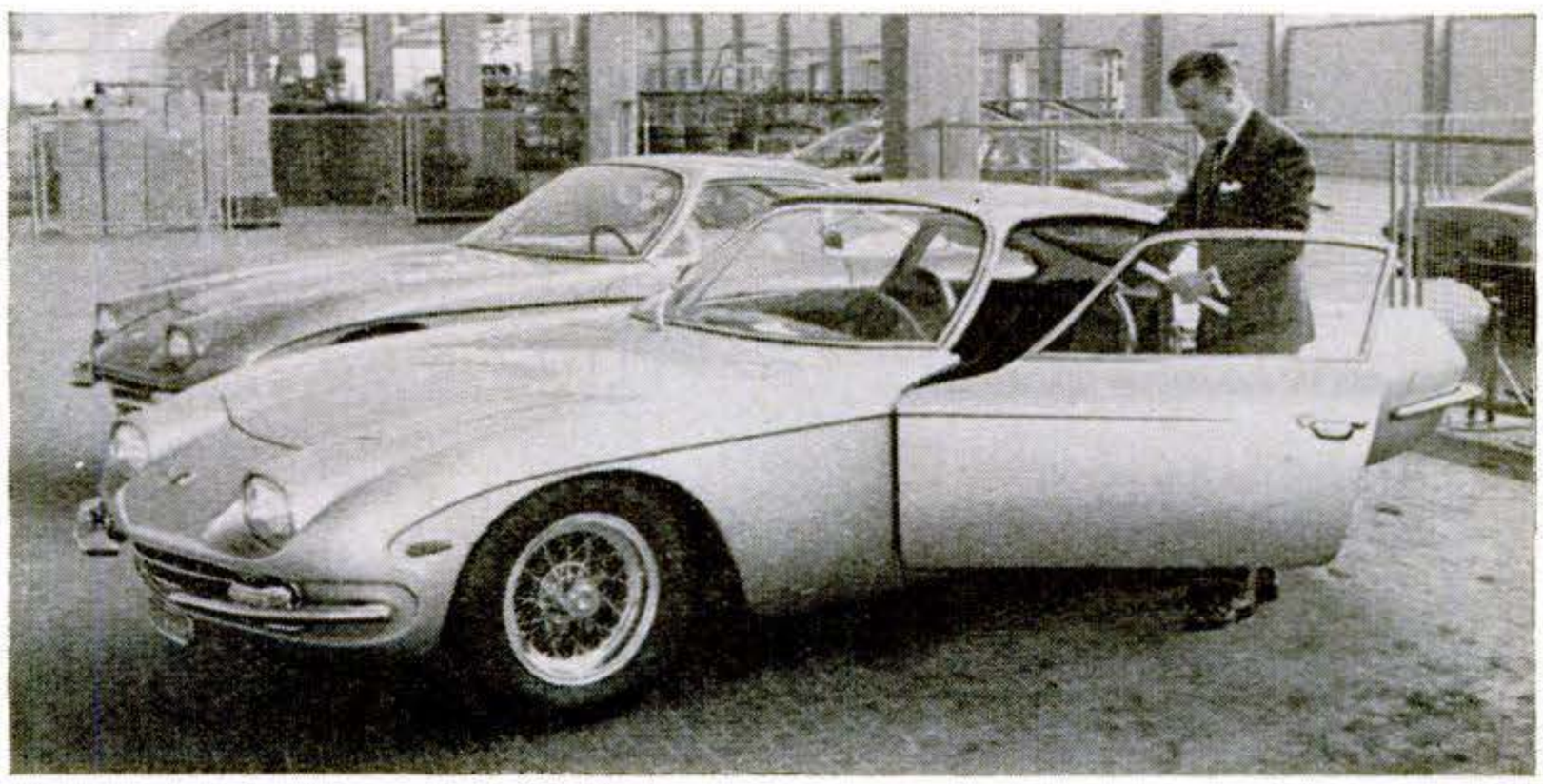
What's new at BMC? British Motor Corp. brought out its first front-drive car, the Mini-Minor, in 1958. Now BMC has three sizes of front-drive models, and the two smaller series are available with automatic transmission. I drove an Austin 1100 with this new automatic and found it works very well. The floor-mounted lever has seven positions, giving the driver a choice of pure automatic operation or manual selection of four forward speeds. Starts are slow, whether driving with automatic or shifting manually, but as soon as second gear comes in at about 20 m.p.h., the pickup is quite brisk. The automatic transmission weighs 25 pounds more than the standard transmission, and power losses in the hydraulic converter are said to be five percent at 2,500 r.p.m. and 2.7 percent at full speed. The extra cost is high: about $275.

What's new at Triumph? Triumph is the latest British convert to front drive, and the new 1300 is one of the nicest cars Triumph

[Continued on page 201]

Production Lamborghini has front V-12

Lamborghini 350-GT is one of the fastest cars in the world. Engine is 336-horsepower four-cam V-12 with six Weber carburetors. A five-speed transmission is standard. All wheels have independent suspension with coil springs. Lightweight body can be had as a coupe or an open two-seater.



Copyrighted material

You build this pro-style timing light from a kit

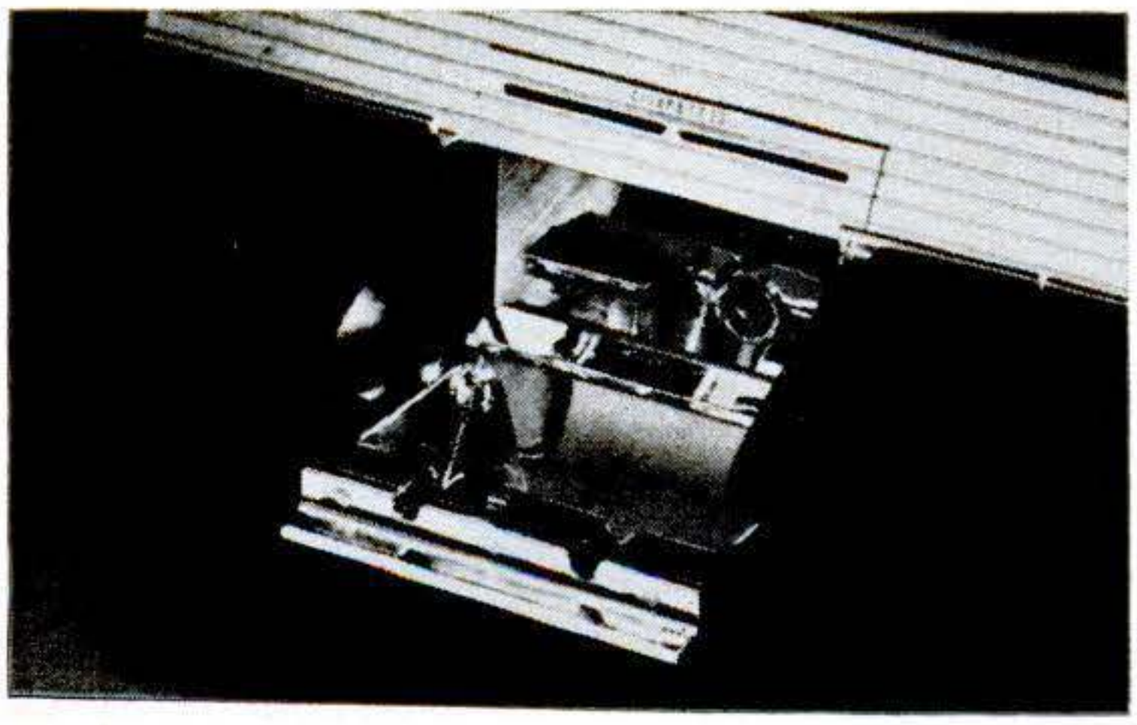
If you're willing to wield a soldering iron for a few hours, you can own an ignition timing light —the superbright xenon-flash kind pro mechanics use—for about half price: $20.

The Knight kit KG-371 has a built-in transistorized power supply that steps up a car's battery to 600 volts to run an electronic flash tube. Its blue-white bursts of light are so intense, there's no need to work under dim lights with it when you tune-up your car's engine.

To use the timer, connect the power leads to the battery terminals, and the trigger cable to the No. 1 spark plug; an adapter (foreground, at right) makes it easy. The unit works with six- or 12-volt, positive- or negative-ground ignitions. Allied Radio, Chicago, sells the kit.

Lightweight tire-pressure gauge

This dial-face tire-pressure gauge weighs just one ounce and measures only 3½ inches in total length. It is designed for motorists unfamiliar with the barrel-type gauge used by mechanics. The dial holds its reading until the sweep hand is released by a button on the back of the housing. Automark gauge comes in a vinyl case for $2.19. Jay International Corp., 919 N. Michigan Ave., Chicago.



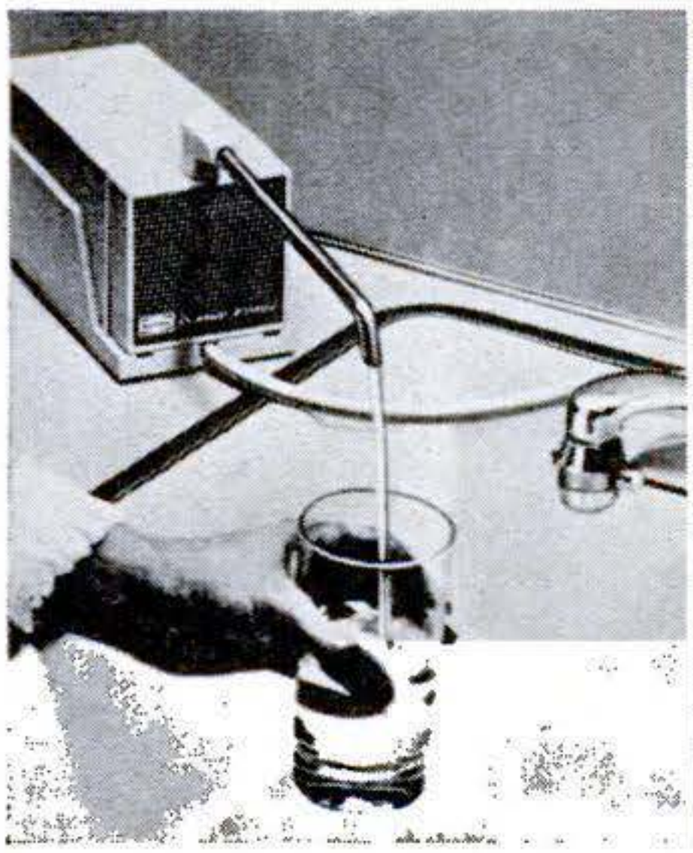
No-hands lighter delivers cigarette

Here's an electric cigarette lighter for your car that carries its own supply of 20 cigarettes (king size or regular) and delivers a lighted cigarette 10 seconds after the touch of a button. It's to make lighting up safer for drivers. Cases are made for either dash or console installation. The Ronson lighted-cigarette dispenser is so new that prices haven't been set yet. Forecast: around $50.

Copyrighted material

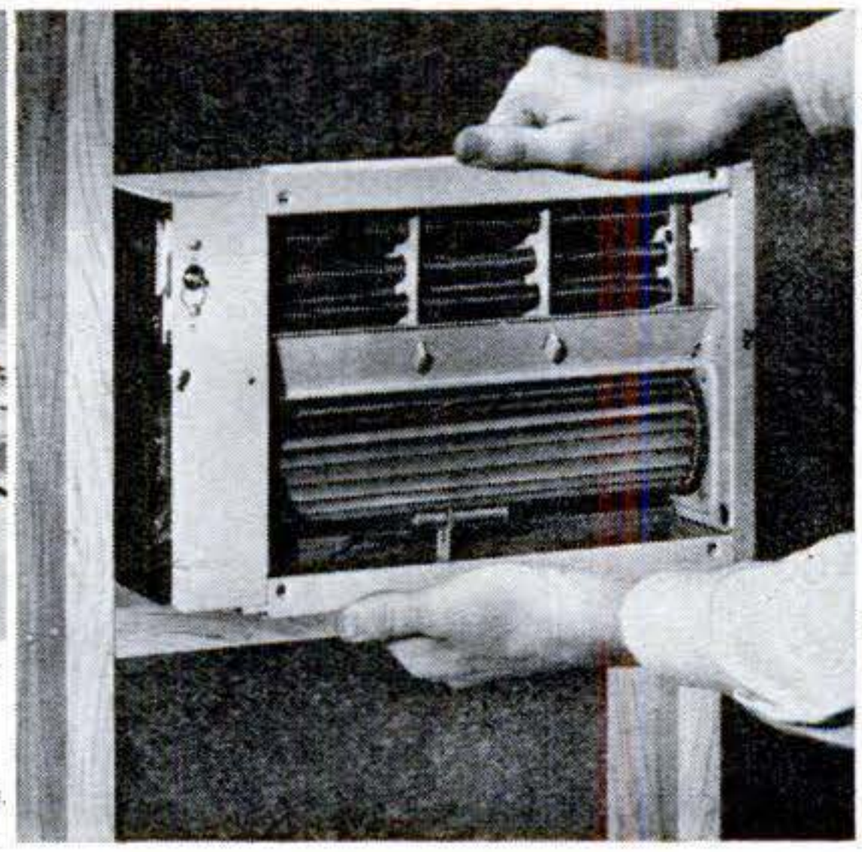
Plywood panels are getting bigger—and bigger

New giant-size plywood will make houses go up faster. In the photo above, 8′-by-8′ panels made by Weyerhaeuser are being put on a test home. But this is just a trial size to see how well the big panels work. Size up to 8′-by-20′ may be on the way soon. This experiment will show if the panels are acceptable for homes under FHA-insured mortgages.



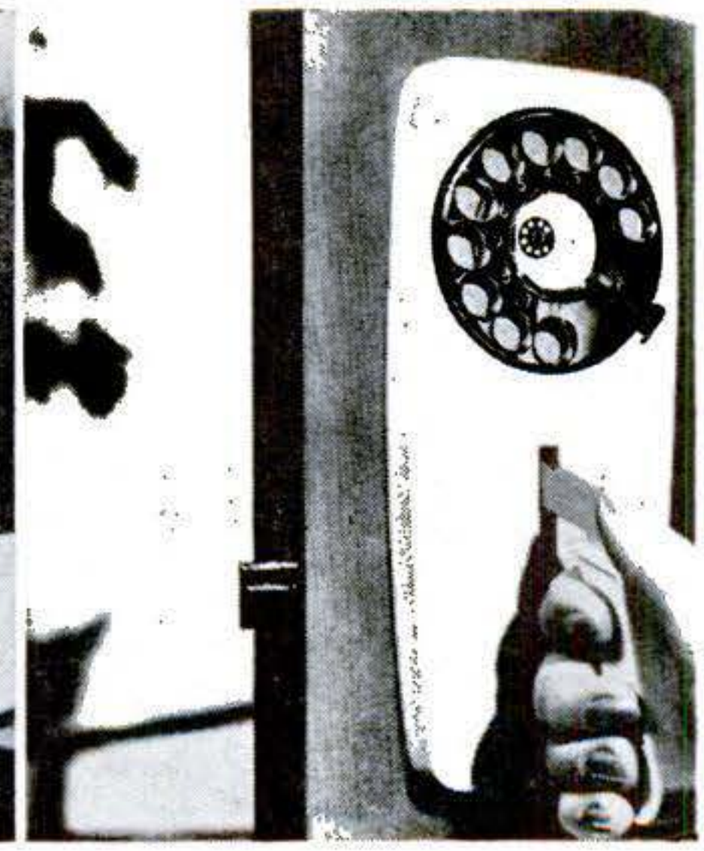
New sink-top filter unit cleans drinking water

Hook this new appliance to a faucet to remove objectionable tastes, odors, discoloration, or cloudiness from water. An activated-charcoal filter removes tastes and odors of chlorine, sulfur, rust, scale, and algae. A button on the faucet aerator diverts the water through the filter. Made by the Heater Div., Eaton Mfg. Co., of Cleveland, it costs $20.



In-wall electric heater fits between studs

Only 14½″ long, 8″ wide, and 4½″ deep, this new forced-air electric heater fits standard 16″ stud spacing. The front grille doesn't get hot, the blower runs quietly, and the thermostat keeps room temperature even. It's made in 1,500-, 2,000-, and 2,500-watt models for 240- and 208-volt operation by Hunter Div., Robbins & Myers, 2500 Frisco Ave., Memphis, Tenn.

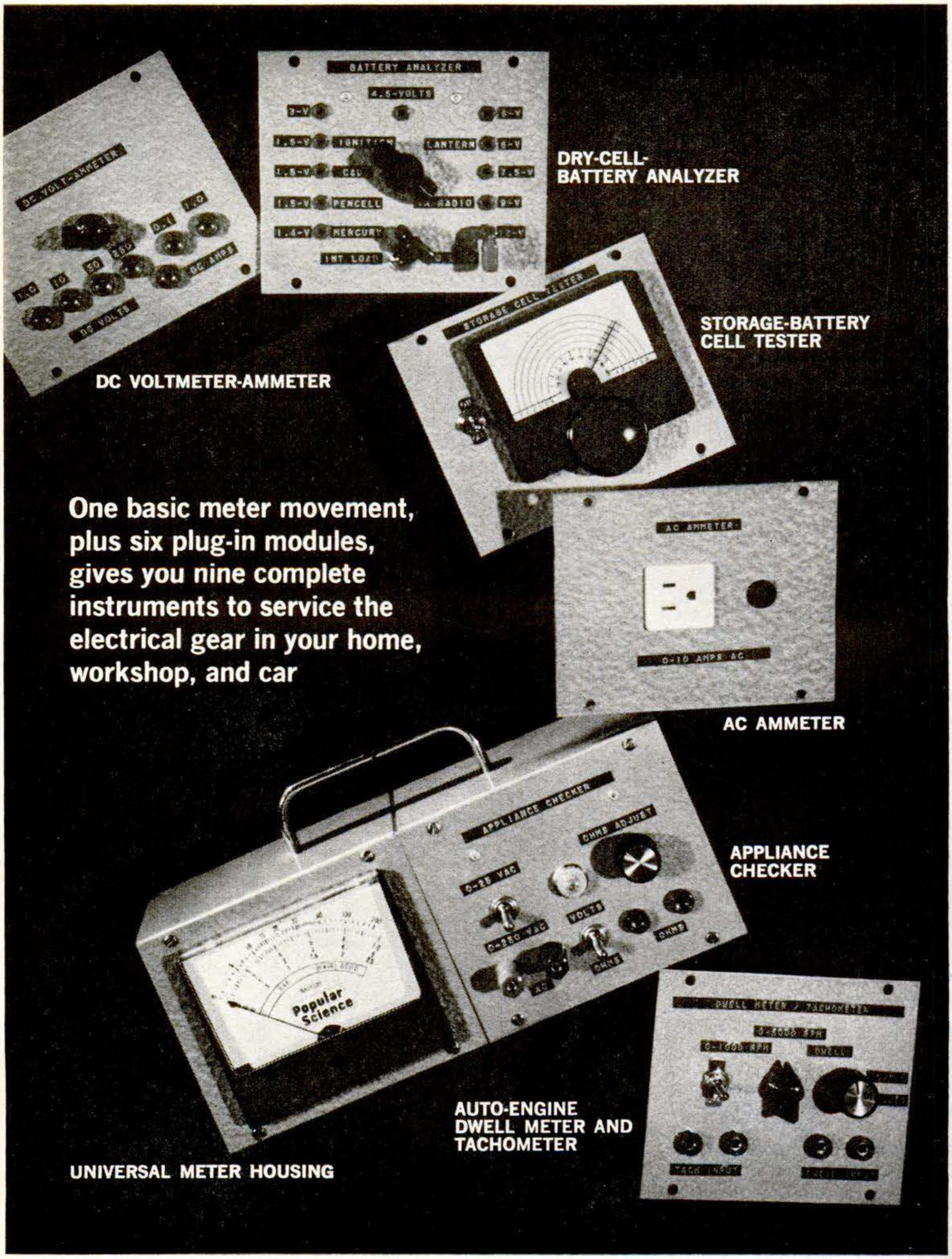


Dialing four numbers opens keyless door lock

You can't forget your key with a Dialoc on your door. There is no key. You just dial the numbers, lift the latch, and you're in. Press the handle lightly, and the door is locked again. It has an automatic deadbolt. The lock can't be picked or jimmied, and the combination is easily changed. Dialoc Corp., 3120 46th Ave. North, St. Petersburg, Fla, makes it.

Copyrighted material

Popular Science's



DRY-CELL-BATTERY ANALYZER

STORAGE-BATTERY CELL TESTER

DC VOLTMETER-AMMETER

One basic meter movement, plus six plug-in modules, gives you nine complete instruments to service the electrical gear in your home, workshop, and car

AC AMMETER

APPLIANCE CHECKER

AUTO-ENGINE DWELL METER AND TACHOMETER

UNIVERSAL METER HOUSING

Copyrighted material

9-in-1 Troubleshooter

Here's the first of a new series that shows you how to build a unique set of electrical test meters. This month, make an appliance checker and battery analyzer

By **RONALD M. BENREY** / *PS Electronics Editor*

No question about it, accurate test instruments are real time-savers when you service electrical gear in your home, workshop, and car.

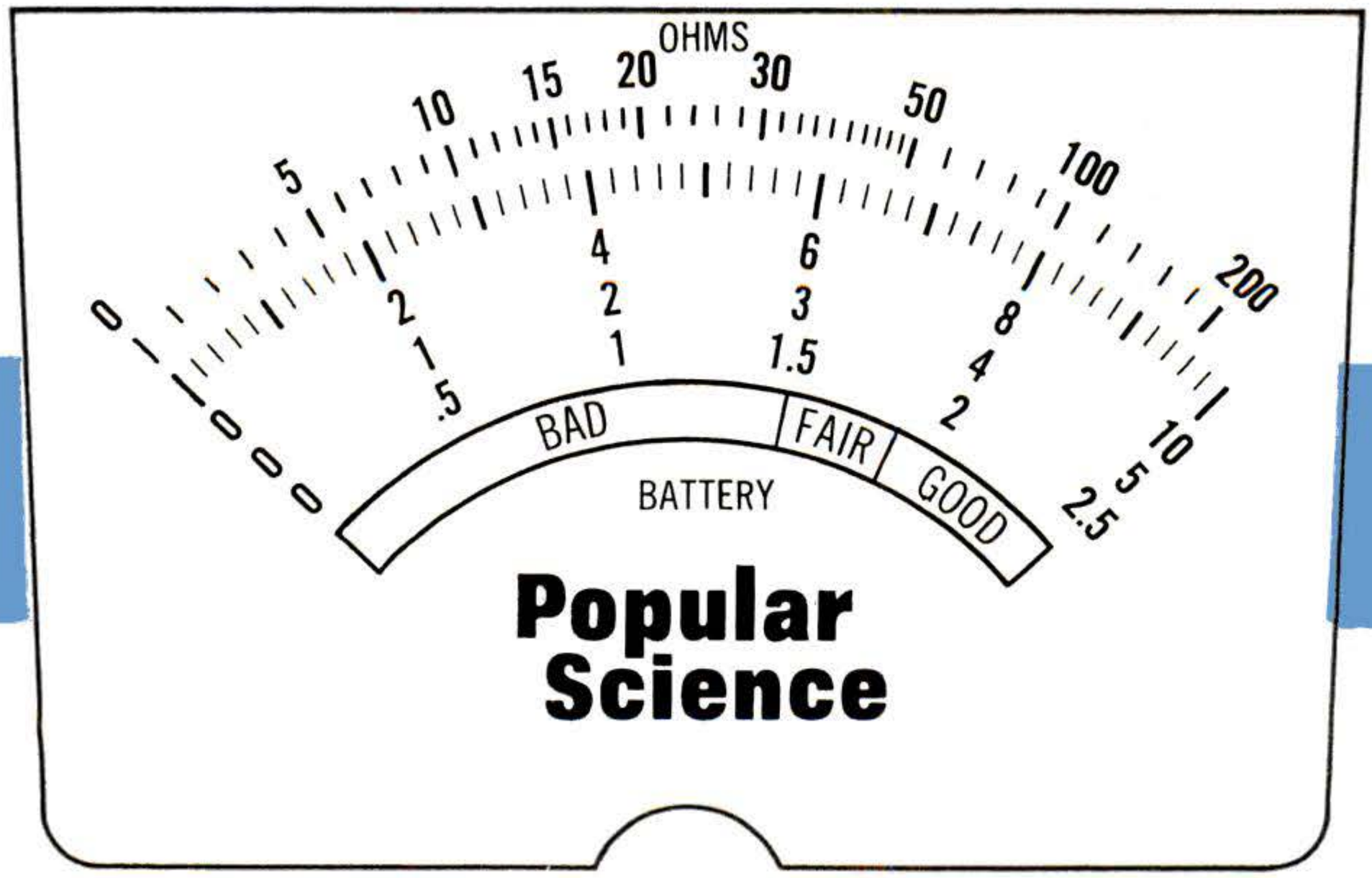
That's why we developed the PS 9-in-1 troubleshooter. This easy-to-build multi-tester does the work of nine individual test meters—it's the equal of a shelf of instruments. It will help you to repair and maintain anything electrical, from your power drill to Junior's motorized dump truck to your wife's toaster.

A unique feature is the money-saving modular design that lets a single panel meter wear nine different hats. The nine test circuits are housed in six modules that fit into the universal meter housing:

- Appliance checker—it measures two ranges of AC voltage (0-25, 0-250) and resistance from 0-200 ohms, to test heating elements, switch contacts, transformers, solenoid coils, motors—everything you're likely to find inside a home appliance.
- Battery analyzer—it tests common dry-cell batteries under load to give a "good-fair-bad" reading you can trust.
- DC volt-ammeter—it measures four ranges of DC voltage (0-1, 0-10, 0-50, 0-250), and two ranges of DC current (0-0.1, 0-1 ampere).
- AC ammeter—it measures AC current from 0 to 10 amperes.
- Auto-engine tachometer/dwell meter—it measures two ranges of r.p.m. (0-1,000,

Continued

For a professional-looking instrument, cut out this full-size, accurately calibrated, multi-range scale, and rubber-cement it to face of panel meter M1. Mount meter on aluminum panel first, then pry off its plastic front cover (use a thin blade knife for this, and work carefully).



Copyrighted material

0-5,000), and ignition-point dwell in degrees.

- Storage-cell tester—it measures the individual cell voltages of auto and marine lead-acid storage batteries with laboratory accuracy.

Join the module-of-the-month club. Start now by building the meter housing and two modules: the appliance checker and the battery analyzer. Future articles will tell you how to build and use the four other plug-in's shown on the facing page.

Meter housing. Make it by fastening together two aluminum "utility" cases. M1 must be the specific 0-1 milliampere DC meter called for in the parts list. Other meters, even though rated 0-1 ma., have slightly different internal characteristics. Critical calibrating component values in the voltage-, current-, and resistance-measuring circuits have been chosen specifically to give accurate readings on the listed meter.

You will need six right-hand front panels —one for each module. Using the original as a template, cut five extras from 18-gauge sheet-aluminum stock.

Mount the phone jack, S01, on a piece of phenolic (or other insulating) material, and bolt it inside the right-hand compartment of the housing. Make sure the jack is insulated from the case. Run a pair of wires through the joined cases to connect the jack and meter terminals.

Appliance checker. Follow the parts layout shown on the pictorial diagram (right). Mount a small piece of perforated-phenolic circuit board (Vectorboard) on the panel, with angle brackets, to hold the smaller components and battery B1. When installing the four input jacks, J1, J2, J3, J4, make sure their insulating shoulders are centered in the mounting holes with their central metal shafts completely insulated from the panel. Use push-in terminals (flea-clips) as soldering points when you wire the circuit board.

Make test leads out of two four-foot lengths of rubber-insulated test-lead cable. Mount insulated banana jacks on one end, insulated crocodile clips on the other.

To make a line-voltage (120-volt AC) measuring probe, solder the free ends of a six-foot-long line cord to jacks J1 and J2. When the appliance-tester module is mounted in the housing, the plug end runs outside the case through a hole cut in the rear panel.

Battery analyzer. Mount 11-position rotary switch S1 first. Position the 11 positive-input "pin" jacks symmetrically about S1, so that each jack is mounted in line with one of S1's contacts. Bend a length of No. 16 tinned, bare copper wire into a square to serve as the common connection for resistors R12 through R22 (see pictorial diagram).

Make test leads from four-foot lengths of red-and-black rubber-insulated test-lead cable. Mount a "pin" plug on one end of each lead, a crocodile clip on the other.

Both modules connect to meter M1 through conventional phone jacks that mate with outlet S01 inside the housing. Label the modules as shown at the end of the article.

Using the appliance analyzer. Follow these rules to get best results:

For AC-voltage measurements: Always start with S4 at 0-250-volt position. Flip to 0-25-volt range only when you're sure the voltage you're measuring is under 25 volts.

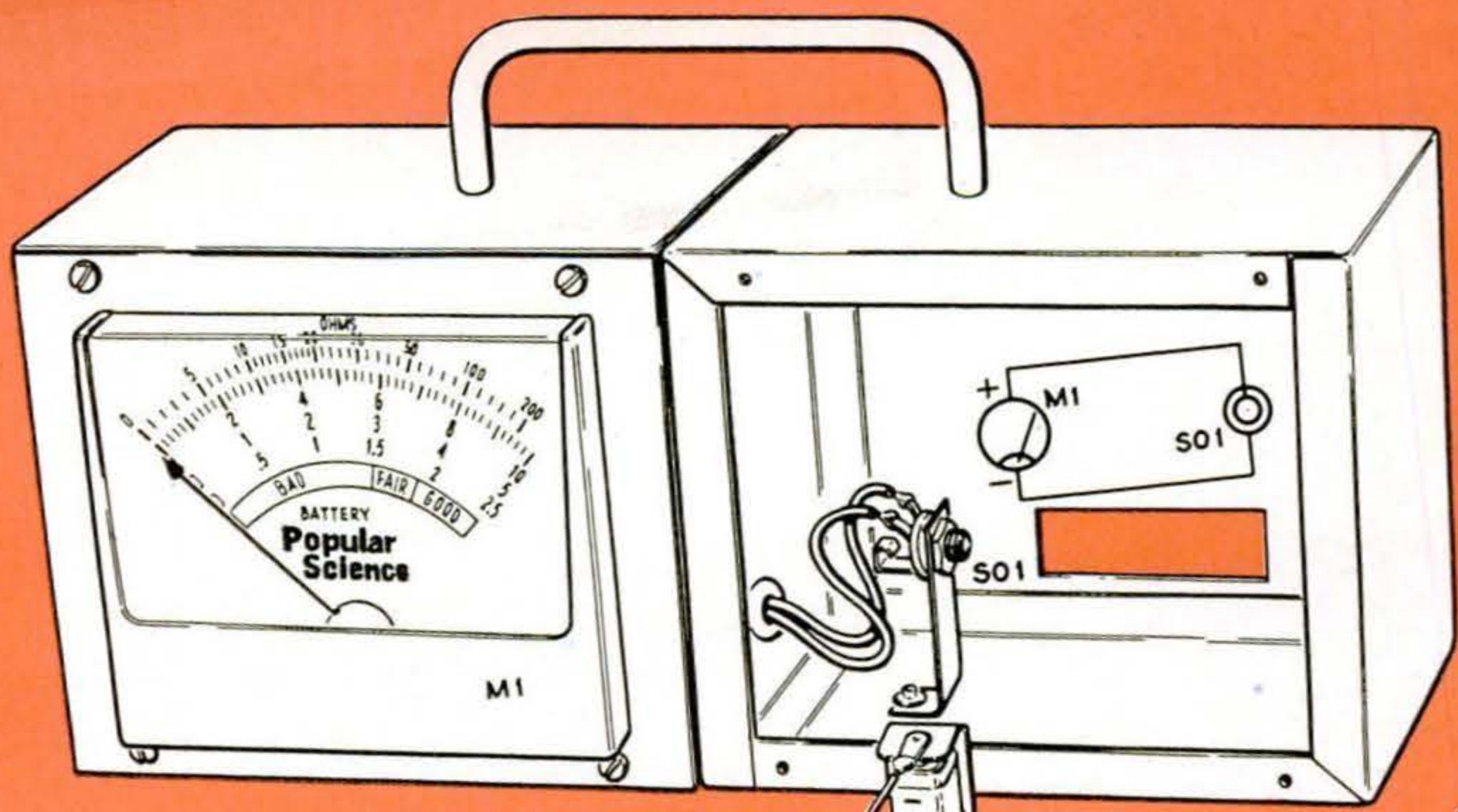
[Continued on page 206]

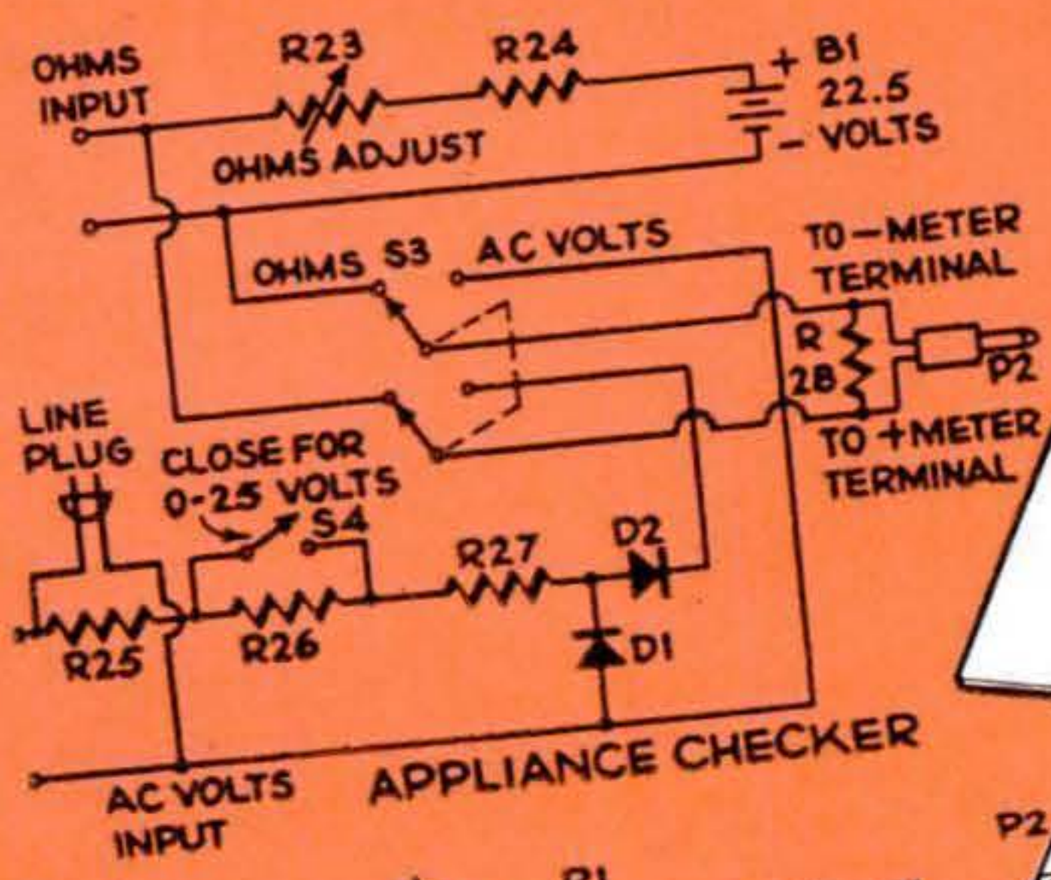
PARTS LIST

NOTE: Resistors R1 through R11, and R25, R26, R27, and R28 are 1%-tolerance precision units.

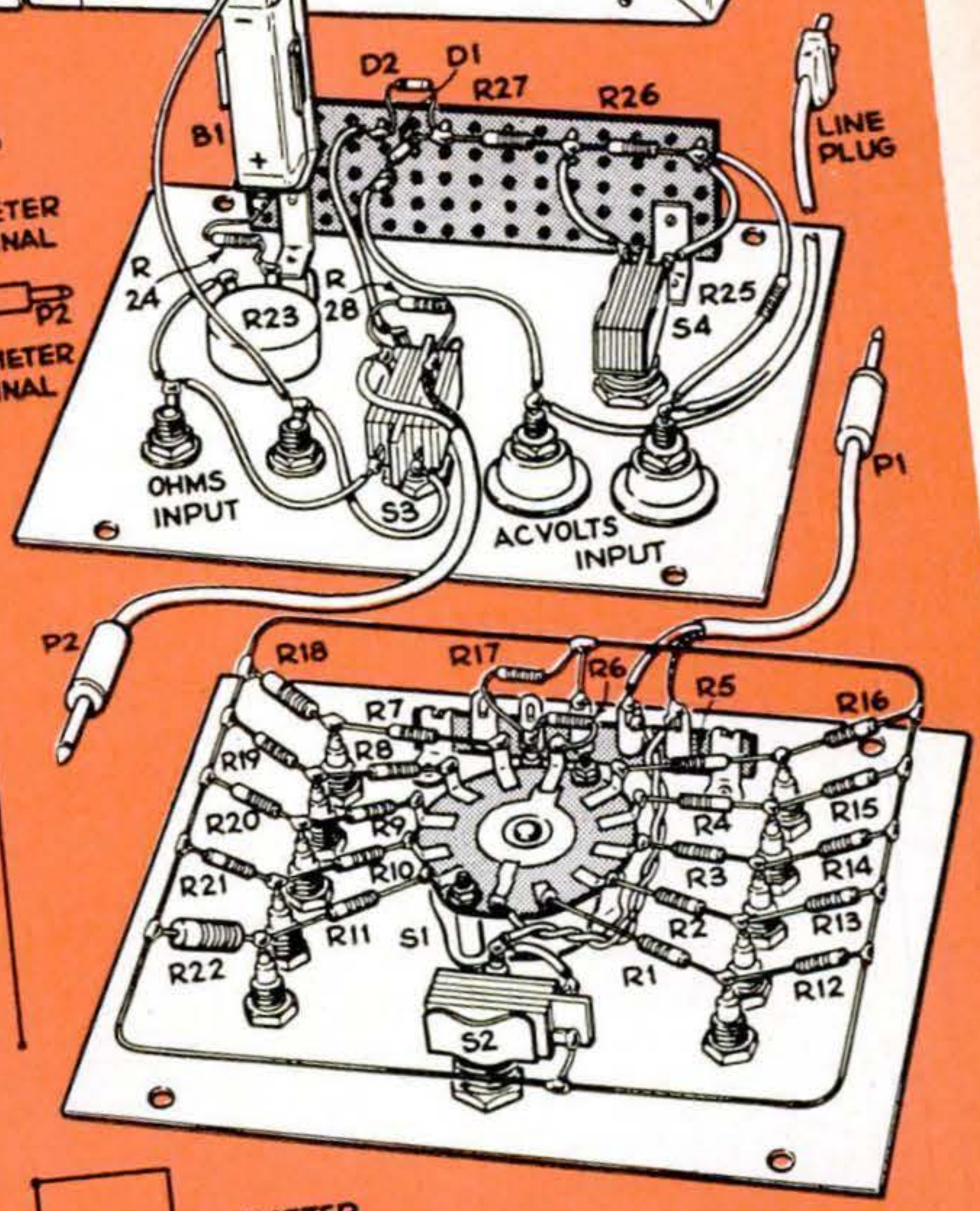
R1—1,400-ohm, ½-watt film resistor
R2, R3, R4—1,500-ohm, ½-watt film resistor
R5—3,010-ohm, ½-watt film resistor
R6—4,640-ohm, ½-watt film resistor
R7, R8—6,040-ohm, ½-watt film resistor
R9—7,500-ohm, ½-watt film resistor
R10—9,090-ohm, ½-watt film resistor
R11—12,100-ohm, ½-watt film resistor
R12, R16—270-ohm, ½-watt carbon resistor
R13—150-ohm, ½-watt carbon resistor
R14—33-ohm, ½-watt carbon resistor
R15—10-ohm, ½-watt carbon resistor
R17—470-ohm, ½-watt carbon resistor
R18—68-ohm, 1-watt carbon resistor
R19—33-ohm, 2-watt carbon resistor
R20—470-ohm, ½-watt carbon resistor
R21—1,800-ohm, ½-watt carbon resistor
R22—120-ohm, 2-watt carbon resistor
R23—5,000-ohm, linear-taper carbon potentiometer
R24—8,200-ohm, ½-watt carbon resistor
R25—432-ohm, ½-watt film resistor
R26—71,500-ohm, ½-watt film resistor
R27—7,500-ohm, ½-watt film resistor
R28—46.4-ohm, ½-watt film resistor
D1, D2—1N60 germanium diode
S1—1-pole, 11-position rotary switch
S2, S4—SPST toggle switch
S3—DPDT toggle switch
J1, J2—5-way, panel-mount binding post
J3, J4—panel-mount insulated "banana" jacks
Pin jacks—11 red, 1 black panel-mount insulated
B1—22½-volt miniature battery in holder
S01—panel-mount phone jack
P1, P2—phone plugs
M1—0-1-milliampere DC panel meter, Simpson "Wide-Vue," 4½", model 1329.
Misc.—perforated-phenolic circuit board, push-in terminals, 5" x 6" x 4" aluminum utility cases (2), angle brackets.
All components available from Allied Radio Co., Chicago 60680.

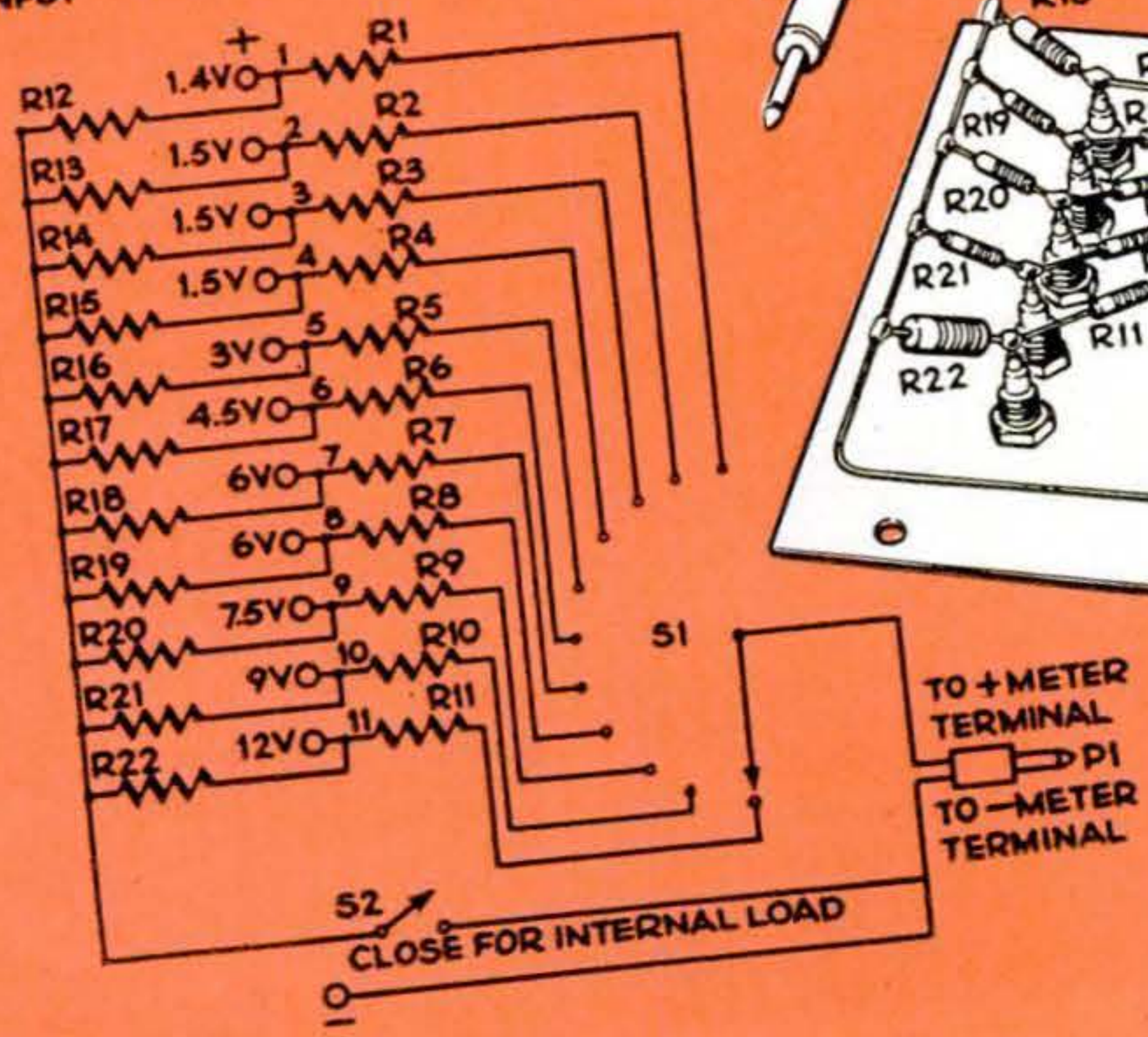
Copyrighted material



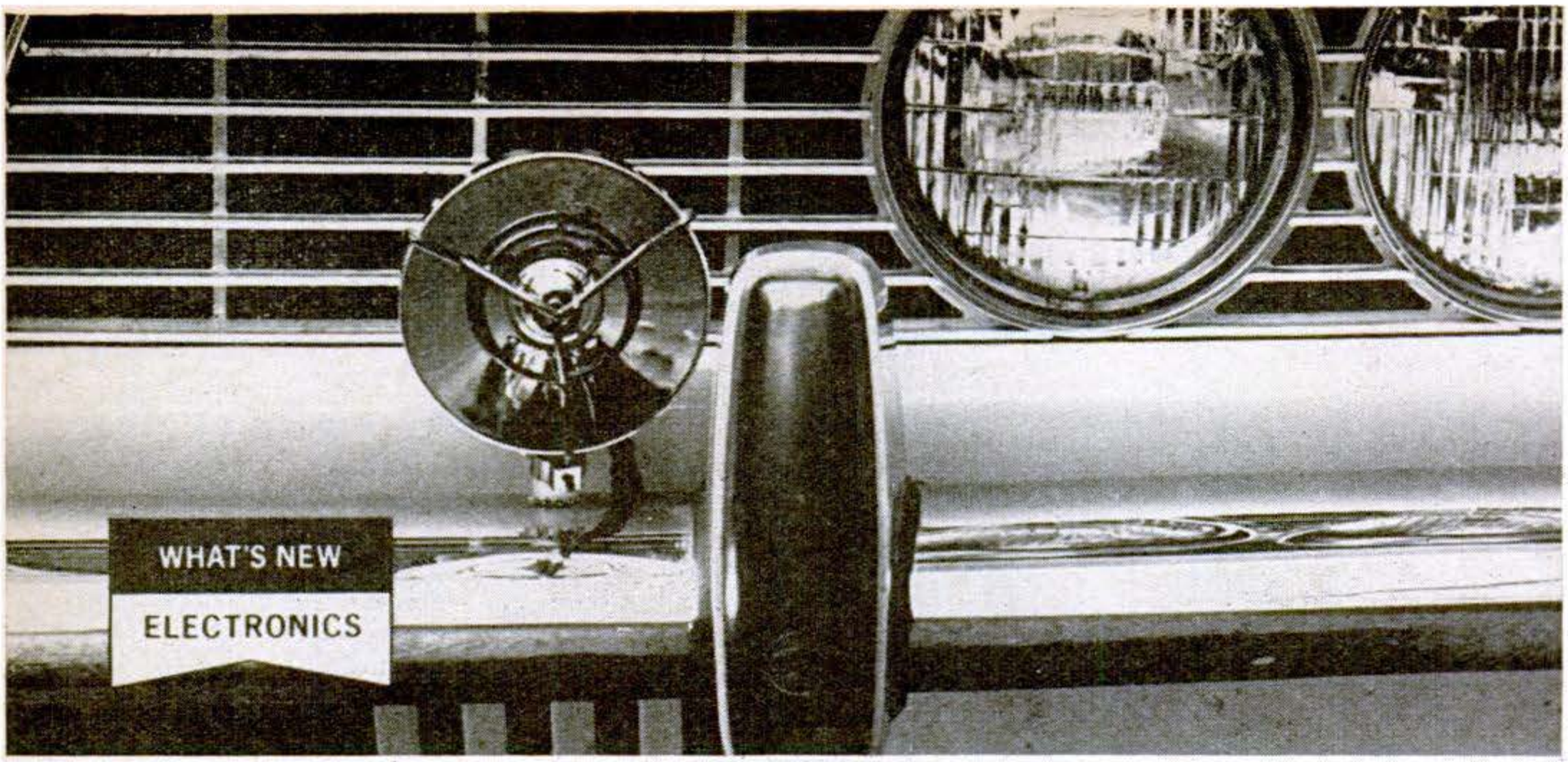


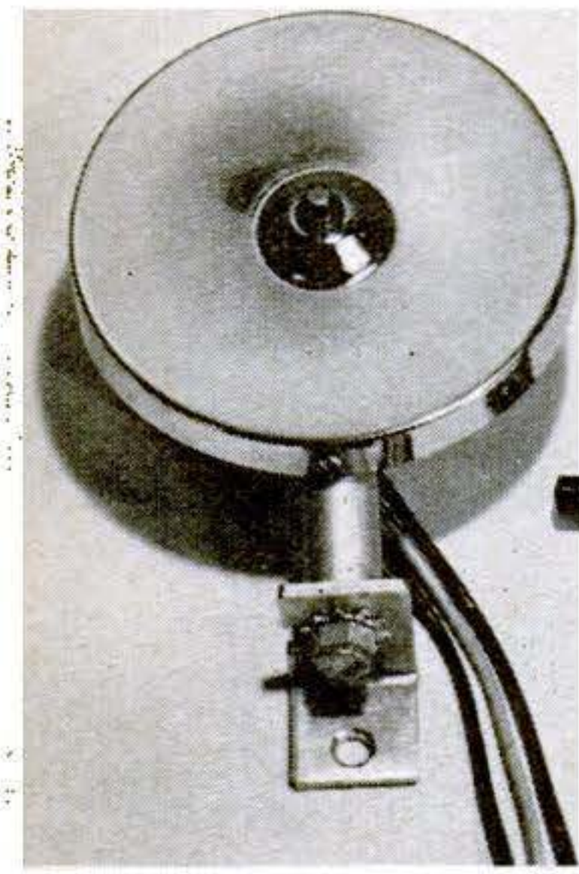
APPLIANCE CHECKER

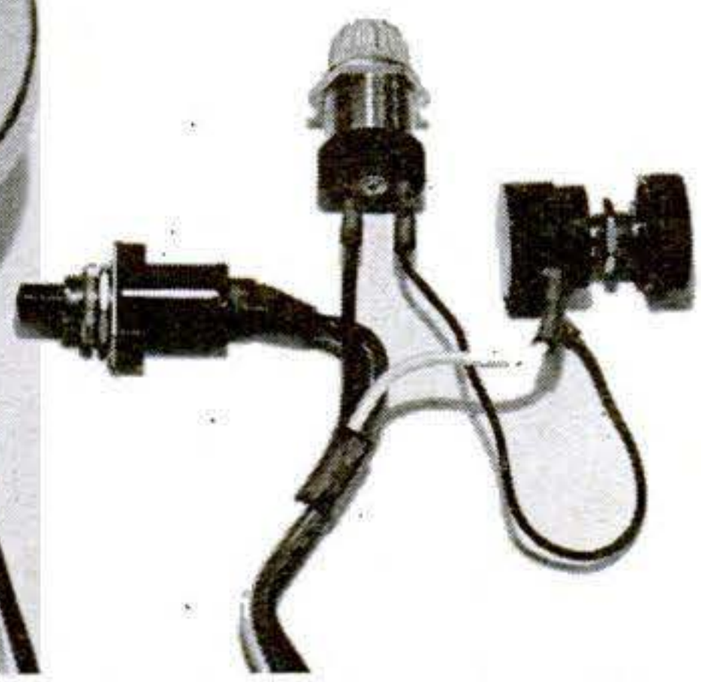


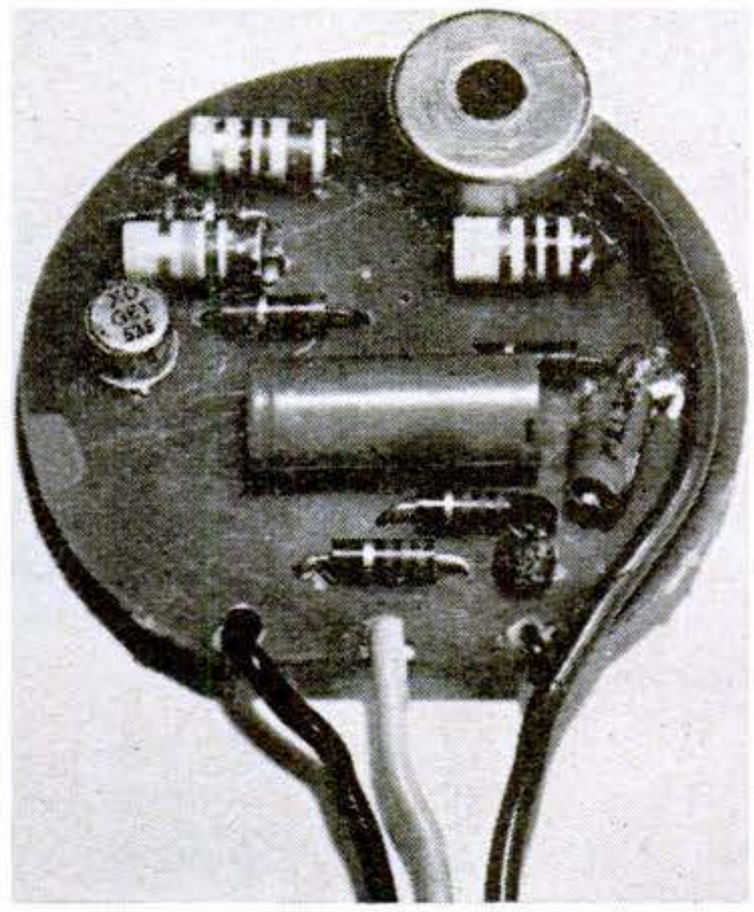


BATTERY ANALYZER









The bump in the center of the bumper-mounted probe (above) is a transistor used to sense air temperature just above the road. Warning light, press-to-test pushbutton, and light-dimmer rheostat mount on the dash. Photo at right shows three-transistor circuit. Top photo shows probe installed.

PERSONAL-USE REPORT:

This Gizmo Warns: Icy Roads

The difference between a wet road and an icy road is only a few degrees on the thermometer. That's why a chilling winter wind can turn the exposed roadway on a bridge or hill crest into a lethal patch of ice—even if the weatherman swears the air temperature is above freezing.

Here's an electronic thermometer for your car that monitors air temperature a few inches above the road, and warns you—through a blinking light on the dash—that conditions are right for ice formation.

The dash light begins to blink slowly when above-road temperature dips to 35 degrees. It blinks faster as the temperature drops lower, and glows continuously when it reaches 32 degrees.

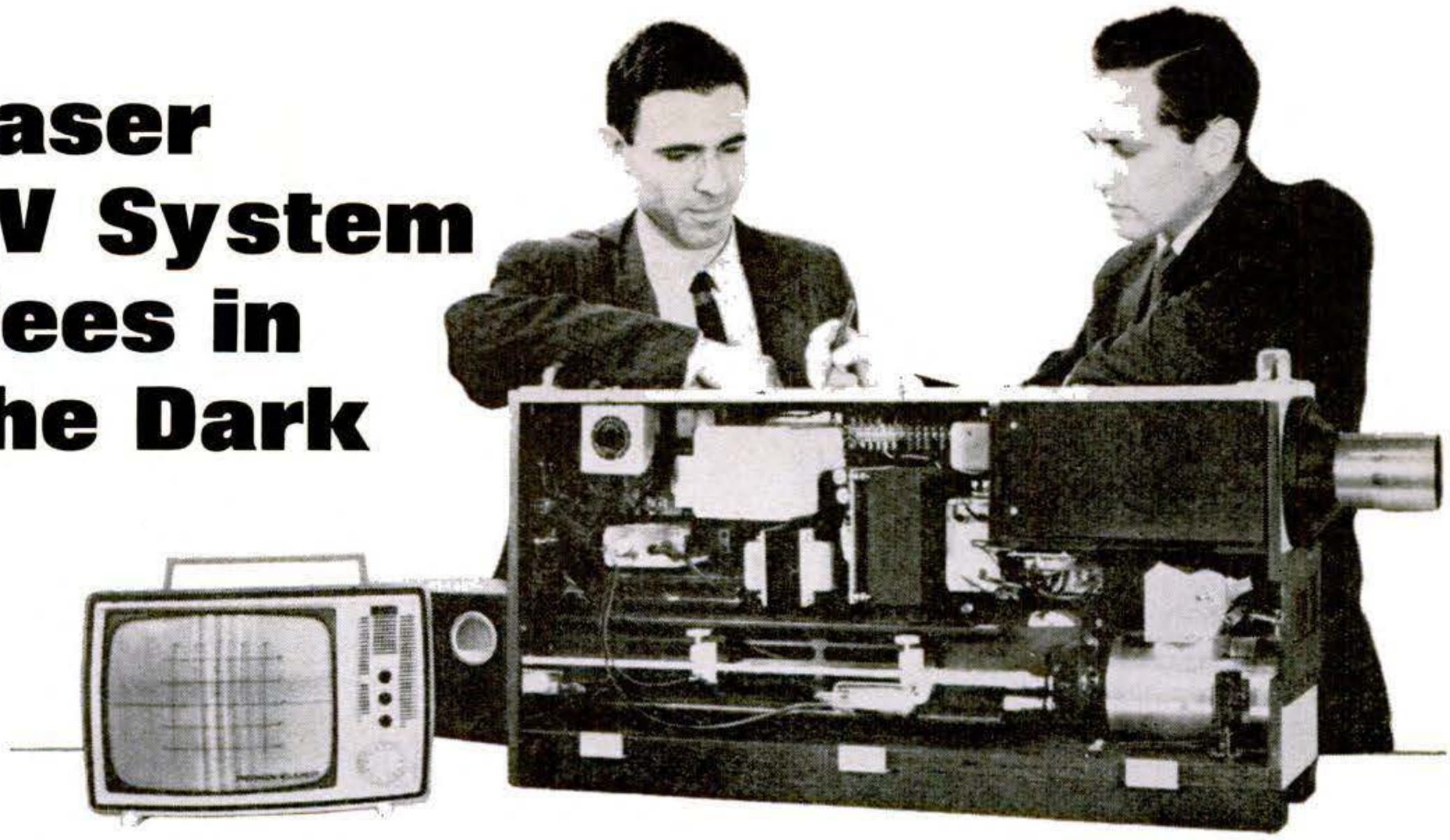
Mount the temperature-sensing probe on your car's front bumper, and install the light on the dash; hook the power leads to the ignition switch and ground.

Two nice features: a pushbutton that tests the pilot light, and a light-dimmer control for night-time driving.

Called "Icelert," the British-made unit is imported by Rover, Inc., 404 Lexington Avenue, NYC, and is available from any Rover dealer. Price: $30.—*R. Benrey.*

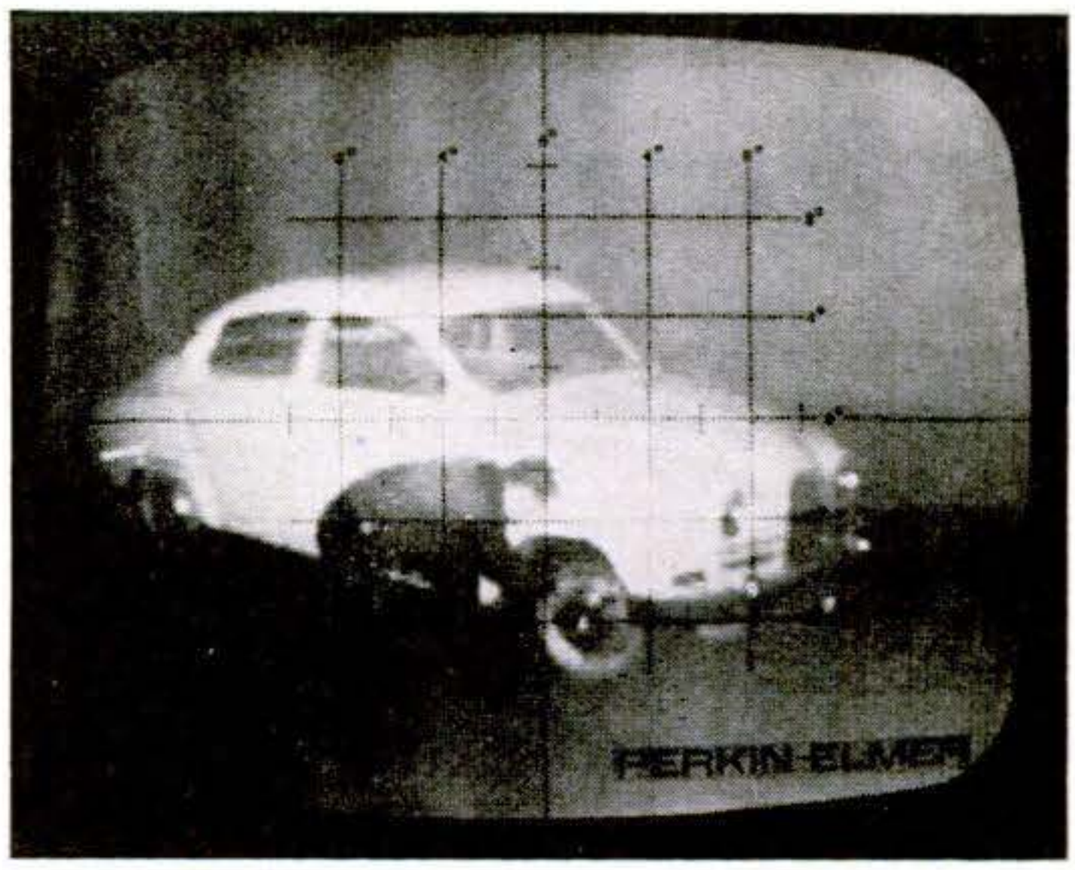
Copyrighted material

Laser TV System Sees in the Dark

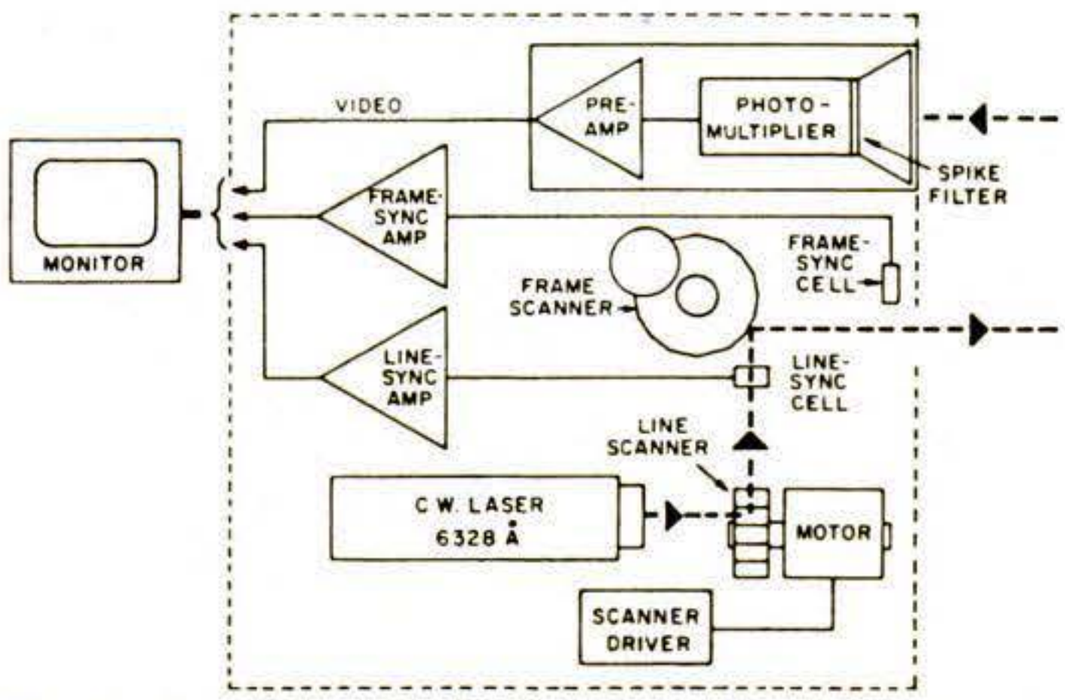


Prototype laser TV camera shown above uses the pure red beam from a helium-neon laser (glowing tube near bottom of chassis) to illuminate the subject. The very-low-power beam scans the scene so quickly that it won't damage human eyesight.

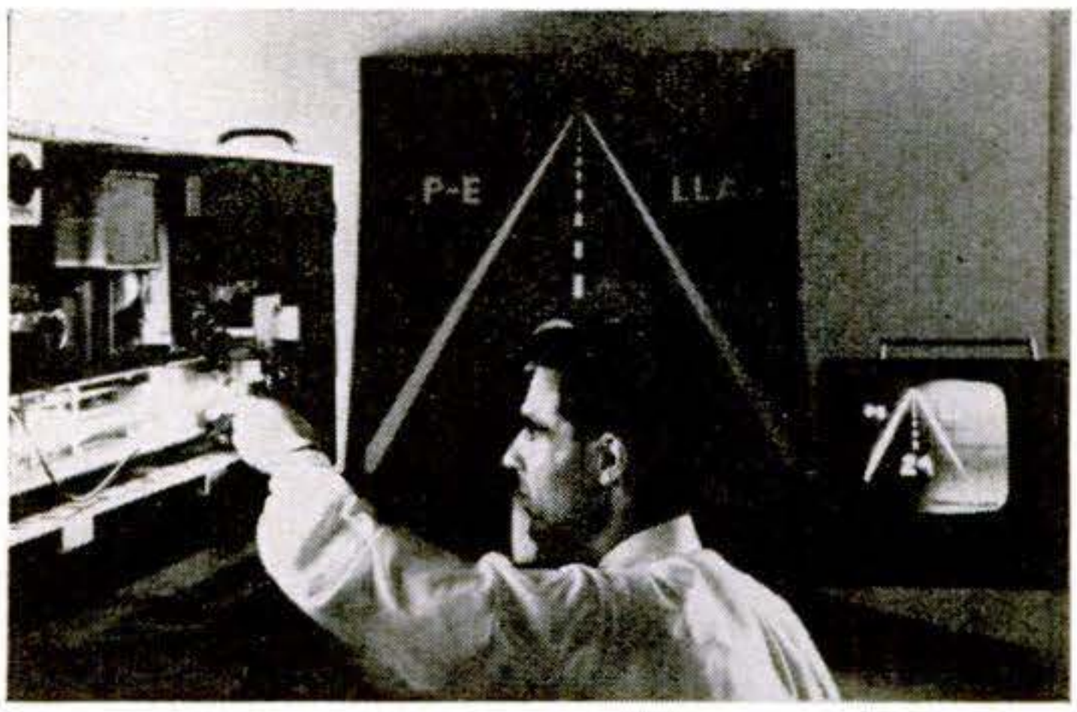
Here's a TV camera that can photograph a black cat in a coal bin—without any external lights. Its secret is a built-in helium-neon laser of low power. A pair of spinning, many-sided mirrors sweep the pencil-thin red laser beam across the subject. The beam moves so quickly that it is invisible. Varying amounts of laser light reflected by the different parts of the subject's surface are picked up by a sensitive multiplier phototube inside the camera. The output signal of the phototube varies correspondingly, and controls the intensity of the electron beam inside the monitor set's picture tube to form an image of the subject on the screen. The TV system was developed by the Perkin-Elmer Corp., Norwalk, Conn.



Picture made at night, through a light drizzle, displays harsh lighting effects. The TV image is similar to a snapshot made with a single flashbulb. This happens because the scene is illuminated by a single light source—the laser within the camera.



Electronic, mechanical, and optical components are used by laser TV camera: Twin motor-driven scanning mirrors sweep the laser beam across the subject; a photomultiplier tube receives the reflected light and produces a corresponding video signal.



Important potential application: A night-landing aid for military aircraft that won't attract the enemy, as might conventional runway lights. The simulated demonstration above shows how reflective runway markings show up on a cockpit TV screen.

Copyrighted material

New "Firsts" in First Aid

AMERICAN RED CROSS PHOTO

The science of giving first aid—like all sciences—is constantly developing new techniques for coping with emergencies. Are you up-to-date on how to stop bleeding, give artificial respiration, treat burns? Do you have the basic essentials—a well-stocked first-aid kit? A number of important changes have taken place in recent years. A few of the more important ones are summarized in the chart at right.

Basically, the new first-aid methods are simple to learn and remember because they play down complicated techniques and home remedies, relying on commonly available materials and common sense. The first rule is to get an up-to-date first-aid guidebook and study it carefully. The few "firsts" given here do not constitute a guide for meeting emergencies and are presented only as examples of new advances in the field of first aid. Injuries will differ in severity and nature, and no single treatment can be prescribed for all.

Among the books available are the American Medical Association's *First Aid Manual*, a handy pocket guide that will fit right in your first-aid kit (10 cents; Chicago 60610), and the American National Red Cross *First Aid Textbook* (75 cents; available at your local Red Cross chapter).

W. Stevenson Bacon.

First-aid supplies

FOR YOUR HOME

1 Package assorted adhesive dressings
2 Packages of 2- and 4-inch square sealed sterile dressings
2 Packages of 1- and 2-inch roller bandage
6 Triangular bandages, 40 by 40 inches
Stock of laundered, wrapped bandages for major wounds, burns; discarded towels and sheets are best
1 Roll of adhesive tape
1 Package absorbent cotton
1 Bar of mild soap
1 Tube burn ointment
1 Small pair sharp scissors
1 Tweezers
1 Eyedropper
1 Clinical thermometer
6 Wood splints, 3 by 14 inches
6 Wood splints, 4 by 30 inches
Tongue blades and wooden applicator sticks
First-aid guidebook
Misc.: safety pins, table salt, baking soda, flashlight, etc.

FOR YOUR CAR

Minimum glove-compartment kit:
- 1 Triangular bandage, 40 by 40 inches
- 2 3-inch bandage compresses
- 6 1-inch compresses on adhesive
- 1 Square yard sterile gauze
- 1 Tube burn ointment
- 1 Pair bandage scissors
- First-aid guidebook

For extensive travel, keep these in your trunk:
- Stock of large and small dressings
- Triangular bandages (six or more)
- Wood splints (three or more) 3 by 14 inches
- Wood splints (three or more) 4 by 30 inches
- Blanket

FOR YOUR BOAT

Minimum kit, similar to that recommended for your car, but packaged in a watertight case or plastic bag. For extended cruising include:
- Stock of large and small dressings
- Additional triangular bandages, 40 by 40 inches
- Salt, aspirin, and motion-sickness tablets
- Extra supply burn ointment
- Ammonia inhalant
- Wire splints

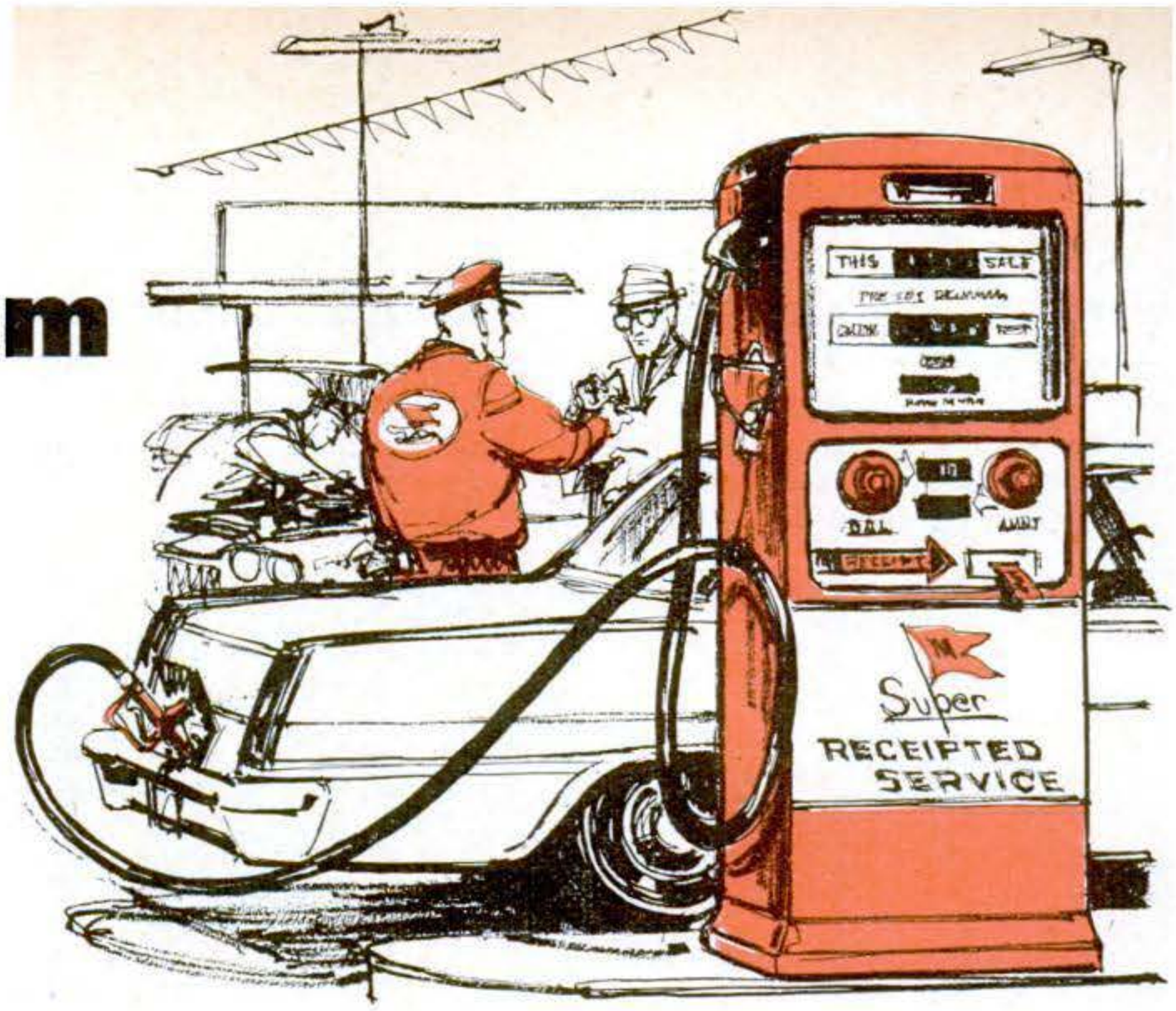
Copyrighted material

Eight new first-aid "firsts" that you should know

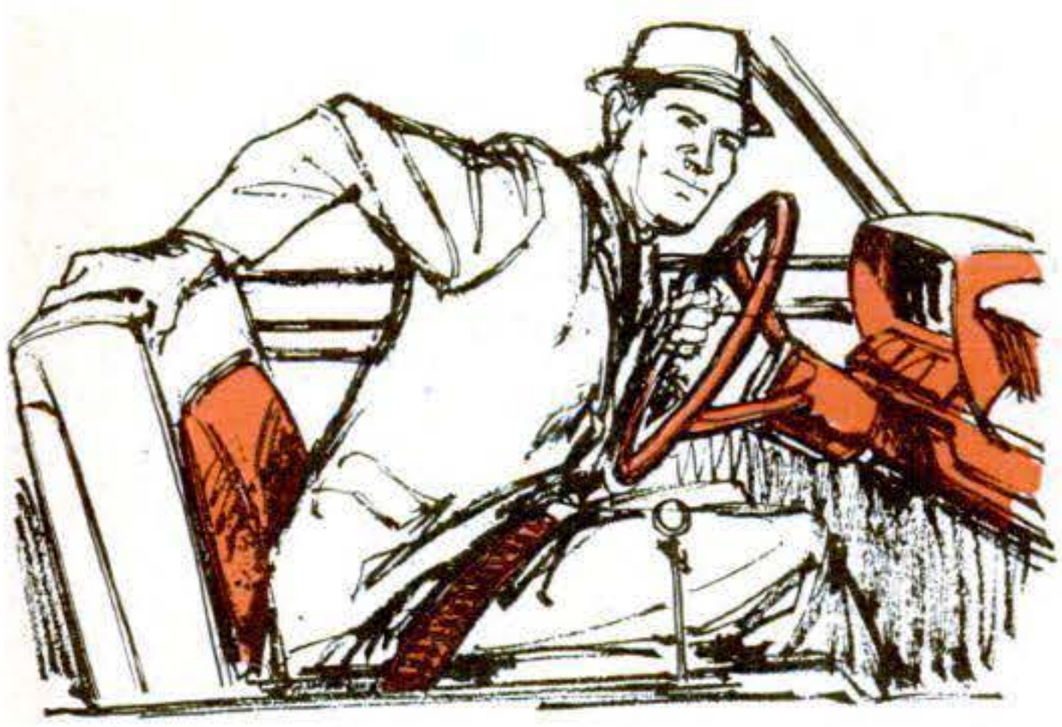
INJURY	YESTERDAY	RECOMMENDED TREATMENT TODAY
MINOR WOUNDS	~~Avoid washing with soap and water; apply antiseptics, sterile gauze~~	DO WASH THE INJURY thoroughly with plain soap and clean running tap water after first scrubbing hands. Apply a sterile dressing and bandage it in place. Use antiseptics only if recommended by physician
WOUNDS WITH SEVERE BLEEDING	~~Use hand or finger at pressure points to stop bleeding. In severe cases, a tourniquet will be necessary~~	USE PRESSURE OVER THE WOUND in all cases to stop bleeding. Press a sterile dressing or the cleanest cloth available over it. If no cloth is readily available, use the bare hand. For very quick action, press your fingers or the heel of the hand hard against the supplying artery. The artery pressure points are on the inner half of the arm midway between the elbow and armpit and just below the groin on the front inner half of the thigh. A TOURNIQUET IS A DESPERATE LAST RESORT AND MAY MEAN LOSS OF THE LIMB TO SAVE LIFE
SMALL BURNS, SKIN UNBROKEN	~~Ointments, salve, or butter~~	COOL THE BURN with water or compresses at 50 to 57 degrees, if practical. This is more effective than ointment, although ointment may be used. Cooling is most beneficial if started immediately and continued for 30 minutes
EXTENSIVE BURNS	~~Dressings dipped in baking soda or Epsom-salt solutions~~	USE DRY STERILE DRESSINGS—wet ones may stick and allow germs to enter. You can sterilize cloths by scorching over a fire. Apply the dressings in four to six layers to exclude air, prevent contamination, and relieve pain. Avoid rupturing blisters. Get immediate medical help
CHEMICAL EYE BURNS	~~Irrigation followed by olive, mineral, or castor oil~~	IRRIGATE EYE IMMEDIATELY with large quantities of clean water, holding victim's eyelid open with fingers. Cover with dry sterile gauze dressing, bandage, and get immediate medical attention. DO NOT put oil or ointments in the eye unless absolutely necessary to relieve pain pending medical help
FROSTBITE	~~Rub with snow; gradually warm frostbitten areas~~	NEVER RUB INJURED TISSUES WITH SNOW. Cover the frozen part and get indoors quickly. Warm it by immersing it in water at body temperatures (90 to 100 degrees), not hot or cold water. Handle the frozen member with great care; never apply heat from a stove, hot-water bottle, etc., as excessive heat will increase the damage
SHOCK	~~Cover warmly and give hot drinks~~	APPLICATION OF EXCESSIVE HEAT IS HARMFUL—the new rule is simply to prevent a large loss of body heat with a blanket or coat over as well as under victim. Keep victim lying down. If patient is conscious and can tolerate liquid, give plain tepid water, neither hot nor cold. Stimulants such as ammonia or coffee have no value in traumatic shock
CONDITIONS REQUIRING ARTIFICIAL RESPIRATION	~~Resuscitation by the prone-pressure (Schafer) method~~	MOUTH-TO-MOUTH RESUSCITATION is the fastest, most effective method. Clean out visible foreign matter, tilt the victim's head back so chin is pointing upward, open your mouth wide and place it over victim's mouth. At the same time, pinch the victim's nostrils shut or close nostrils with your cheek. For an adult, blow vigorously at 12 breaths a minute; for a child use shallow breaths at the rate of 20 per minute

Copyrighted material

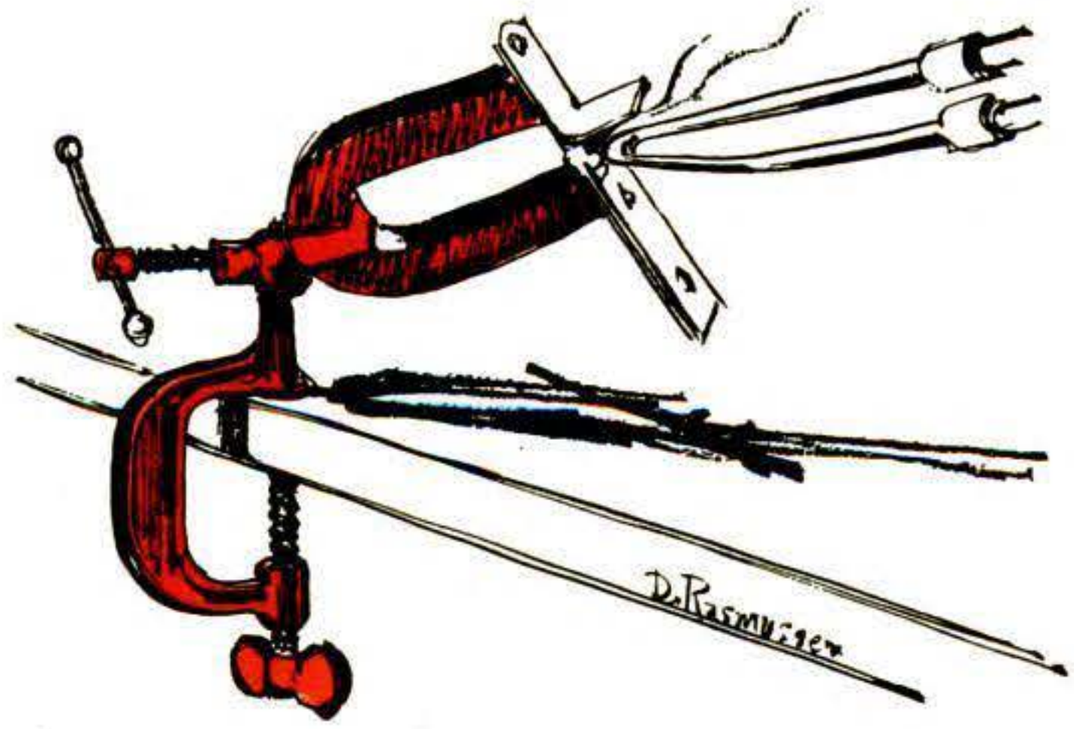
"I'd like to see them make..."



Time-saving gas pumps that could be dialed to pump the number of gallons wanted, and deliver a cash receipt. They'd leave the attendant free to go for change or to record a charge. —*L. C. Jones, NYC.*



Adjustable backrest inserts built into the driver's seats of cars. They'd move back and forth, independent of the seat, to fit the contour of any driver in the family.—*F. M. Scott, Leonia, N.J.*



A clamp joined to a magnet by means of a ball-and-socket joint. The magnet would hold small pieces to be soldered, leaving room for the iron. —*James Hemminger, Techny, Ill.*

Thermostatic signals on washing machines. A light signal or a buzzer would alert the laundress when the water coming in was not at the proper temperature.—*B. L. Fine, Orange, N.J.*

Snap-on hooks for extension ladders, sized to fit between rungs. Hooked over the gutter or window sill of a house, they'd keep a ladder from falling.—*Scott Weigner, Cheyenne.*

Everyone has his own pet idea of a gadget that he would like to see in general use. What's yours? We will pay $5 for each one published. Please use Government postcards only. Send to ILTS Editor, Popular Science, 355 Lexington Ave., NYC 10017. Write your name and address clearly. Contributions cannot be acknowledged or returned.

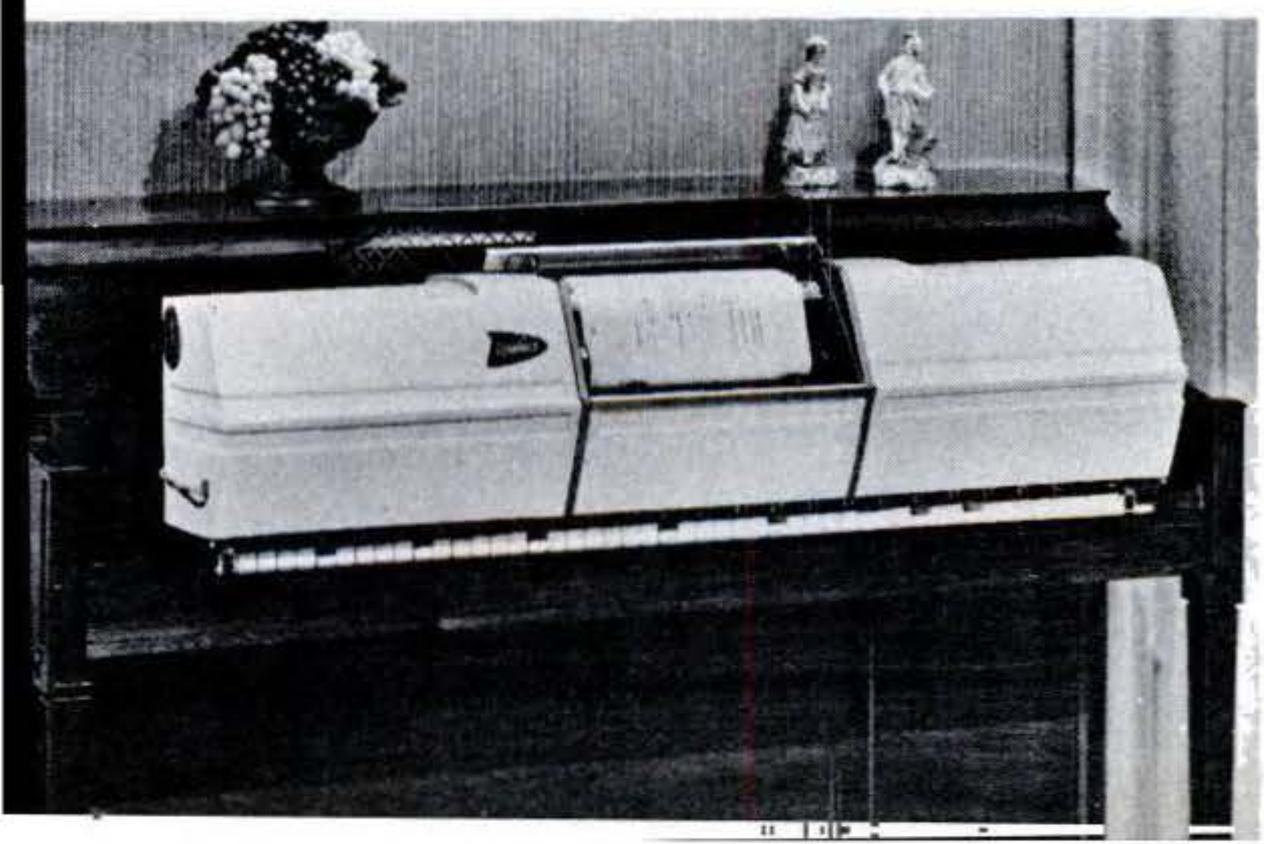
Copyrighted material

Sir Launcelot caper protects riot-busting cops

Like a knight of the Round Table parrying thrusts from spear and sword, this policeman uses a shield to deflect a bottle thrown in a simulated riot. Unlike the metal shields of old, this one, by Rowland Products, Kensington, Conn., gives the policeman a clear view of his attacker. It's made of tough transparent plastic, like that used in space-helmet visors.

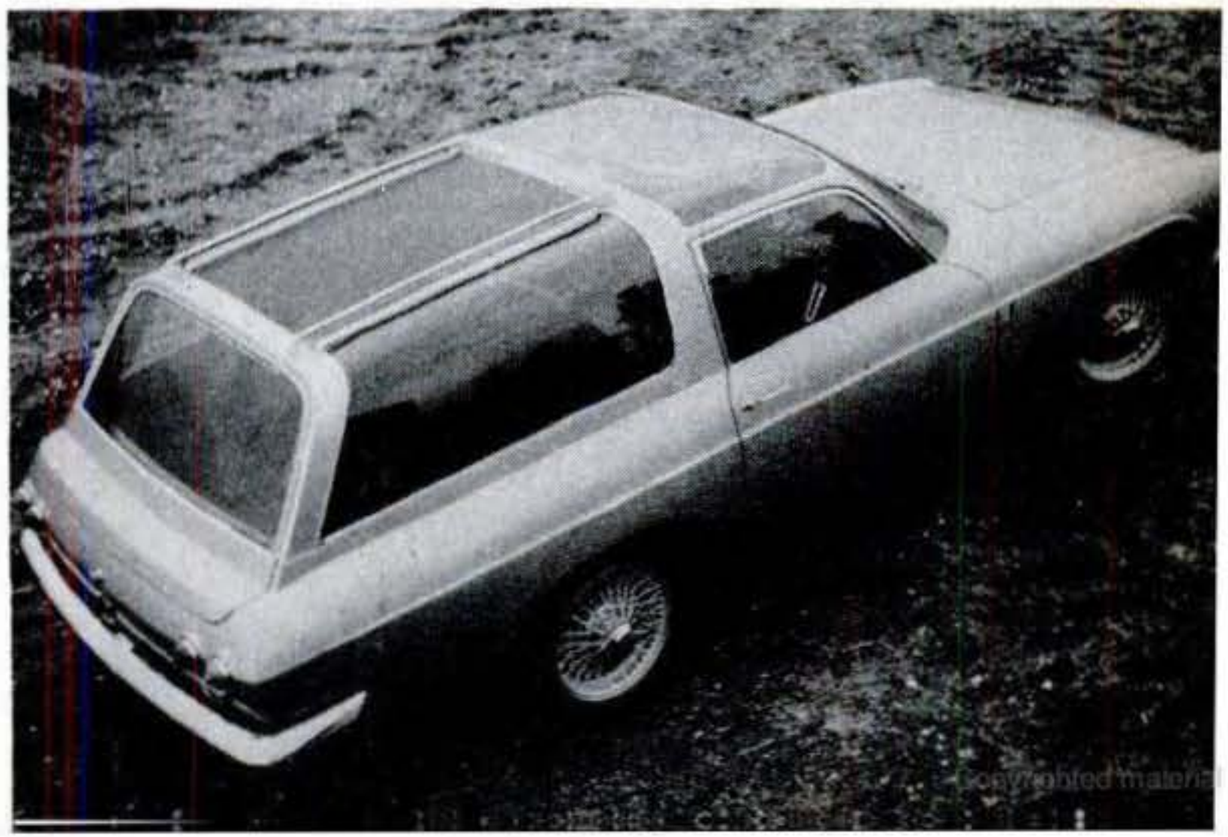
Electric piano player fits on keyboard

An electrical plug-in attachment you can put on or take off the keyboard of any piano in half a minute converts the instrument into an automatic player piano. The device uses standard piano rolls and plays at any desired volume, which you can control. The 35-pound portable piano player, made by Dynavoice, Inc., Plymouth, Mich., sells for $349.50.

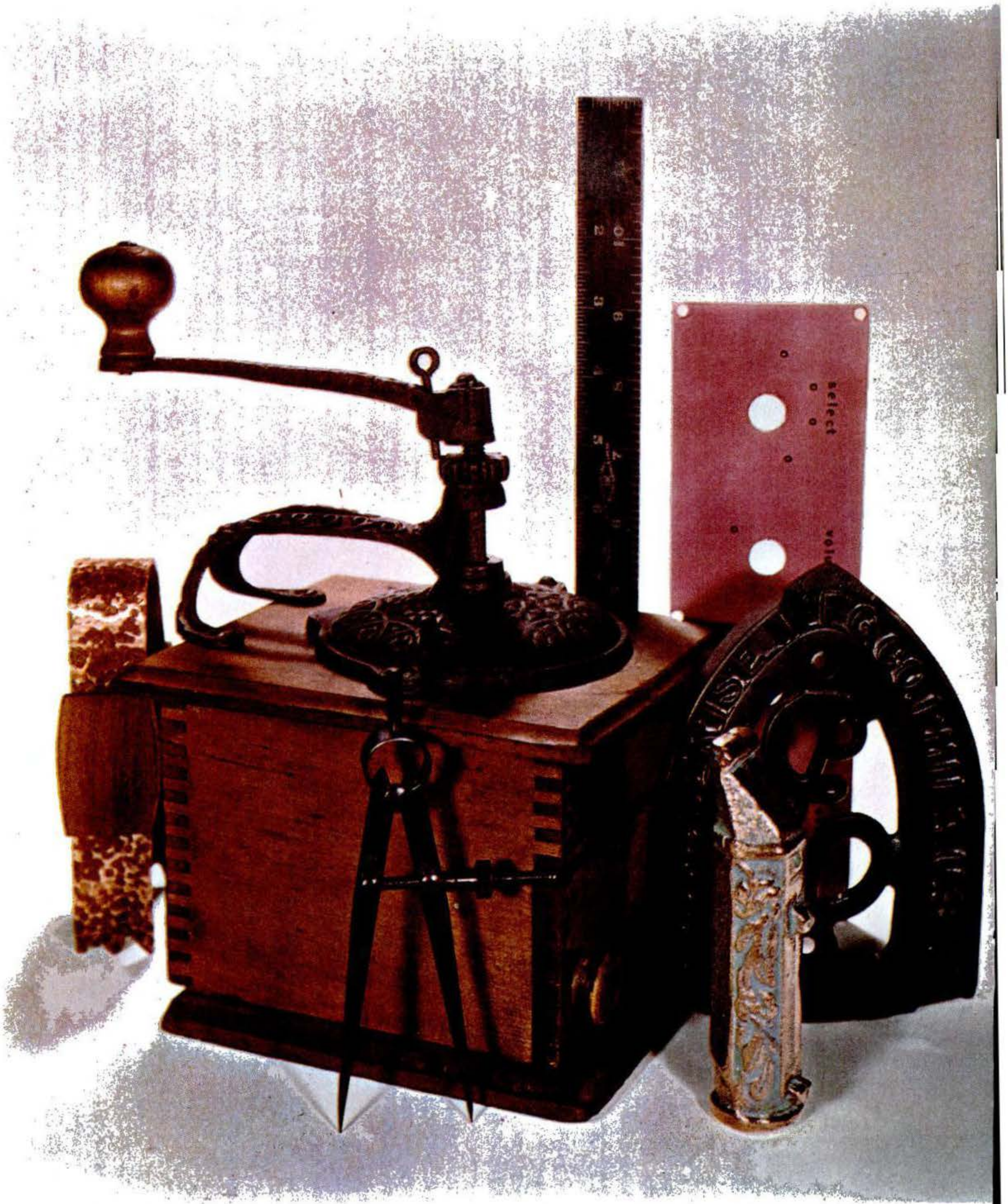


Goldfish-bowl station wagon

This British glass-roofed station wagon looks like a goldfish bowl on wheels. It was built on a Reliant Scimitar G.T. chassis by Triplex Safety Glass Co. of London, using a two-part polysulfide adhesive paste to cement glass to metal without rubber molding strips—thus improving both the vision and streamlining of the car. The heat-absorbing glass holds back sun glare.



Color Those Metal



Copyrighted material

Projects Chemically

You can get striking results with little effort. The materials you need are easily available

By PHIL McCAFFERTY
and T. C. VAN ALSTYNE

Chemical coloring of metals isn't practiced in home workshops as often as it should be. That's a shame. In most cases, the process is simple. Results can be spectacular. And even if they're not that, at least you'll find the results pleasing.

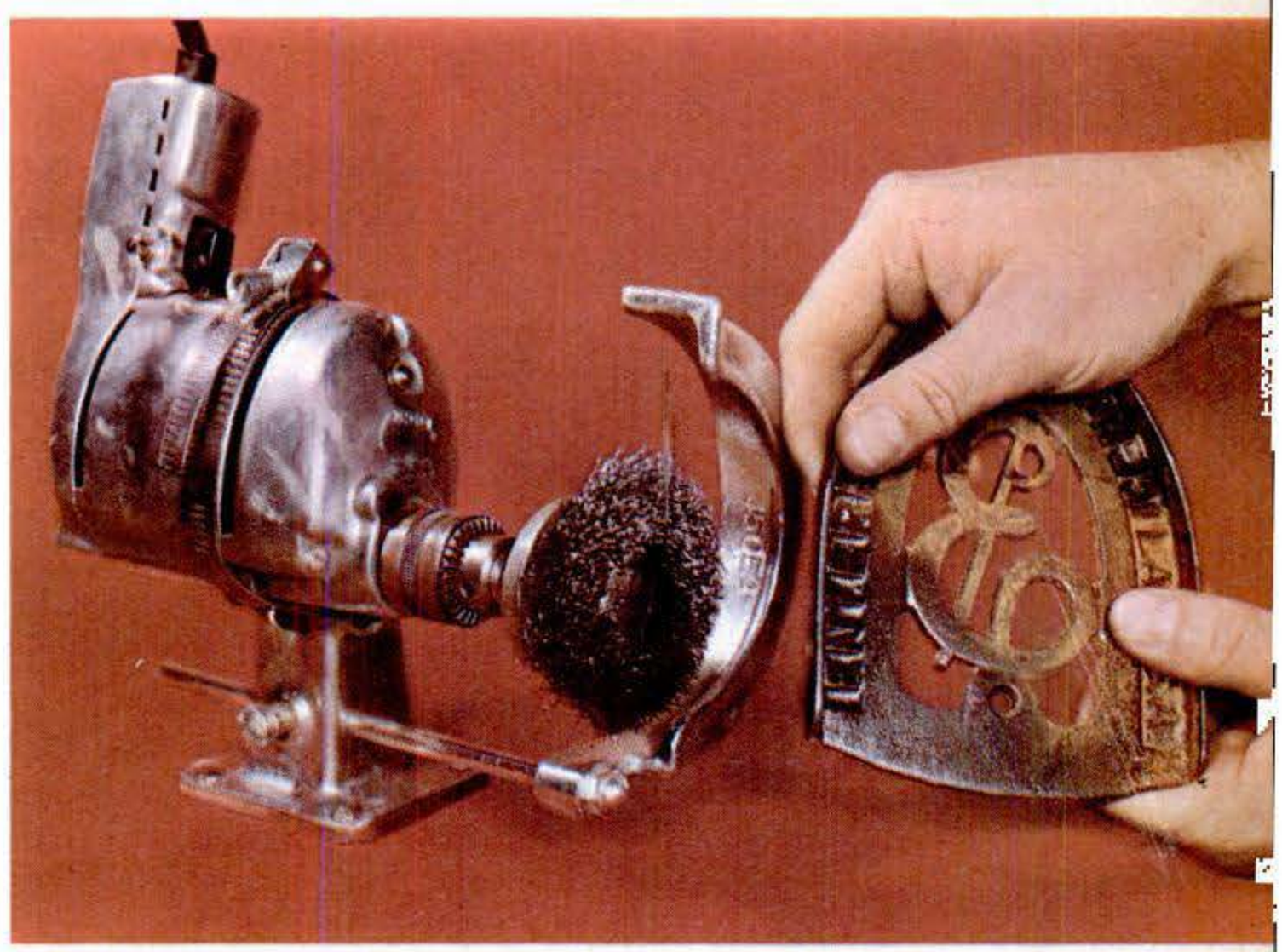
A new shop project, a tool, an art object, or an antique that has lost its charm are all good subjects. You immerse the items or brush on chemical solutions. Some of the chemicals you use are household items.

Coloring metals is an old craft. It was known to the ancient Egyptians, and you can see objects in museums that testify to the permanence of some chemical finishes.

Materials required for experimenting with common metals are listed in the chart on the next page. Gun-bluing solutions are available at sporting-goods stores. The Casey brand coloring solutions, if not available locally, can be ordered from Casey Chemical Co., Box 100, Hopkins, Minn. The photographic fixer, either liquid or powdered, is available at photo stores.

Try a pharmacy for the other chemicals. Hobby stores that sell chemistry-set replacement chemicals will have many of the powdered materials. A mail source for many chemicals is Schaar Scientific Co., 7300 West Montrose Ave., Chicago 60634.

Continued



Metal objects that you want to color must be clean before you start. Remove all prior finishes down to bare metal. Wire brushes, emery cloth, and steel wool will remove heavy deposits.

An easy way to put a black finish on iron or steel items is shown above. Dip the cleaned piece in a strong photographic fixer solution and coat with linseed oil to prevent rusting.

Copyrighted material

The Colors You Get	How You Treat the Metals
BRASS Black	(1) Immerse the item in a solution of 1 part copper nitrate, 3 parts water. A small quantity of silver nitrate may improve the coloration. (2) Swab with Casey's "Perma Brass Black" as per instructions on the container.
Gray	Make a solution of 1 part ammonium sulfite and 4 parts water. Immerse the part. A considerable time may be required to achieve the depth of color desired. Results are not always consistent for this process.
Golden matte	Cover with a solution of 1 part commercial-grade nitric acid, 3 parts water (pouring the acid into the water), and rock the solution gently. Wipe the object clean under running tap. Protect the surface with plastic spray.
Blue-green patina	Paint the item daily for three or four days with this solution: 3 parts copper carbonate, 1 part sal ammoniac (soldering flux), 1 part copper acetate, 1 part cream of tartar, and 8 parts strong vinegar.
Yellow-orange, blue, red-brown	You can get yellow through bluish tones by immersing the item in a solution consisting of 1 tsp. lye, 2 tsp. copper carbonate, and 1 cup hot water. Increase concentrations for bluish tone. Get red-brown shades by brief dip in 1 tsp. copper carbonate, 10 tsp. household ammonia, 1 tsp. sodium carbonate (sal soda) in 1 quart near-boiling water. Cold-rinse and dip in diluted sulfuric acid. Experiment for various shades.
SILVER Black, near-black	Apply Casey's "Perma Brass Black" preparation according to the instructions on the container for brass. Several applications of the preparation will usually be required for deep coloration.
COPPER Light matte, copper	Cover the metal object for a few minutes with a solution of 1 part nitric acid, 3 parts water. Use a ceramic or glass vessel. Shake. Wipe the item clean under tap, and coat it with lacquer. For safety, work with acids outdoors.
Red-bronze, brown, black	For reddish bronze to dark brown, dip in a solution of 2 tsp. sulfurated potash and 3 tsp. lye in 1 quart hot water. Alloy, temperature, time, and concentration vary results. Get black with Casey's "Perma Brass Black."
Blue-green patina	Paint the metal daily for three or four days with solution of 3 parts copper carbonate, 1 part sal ammoniac, 1 part copper acetate (cupric acetate), 1 part cream of tartar, and 8 parts strong vinegar.
Yellow-green patina	Swab the object for a few days with a mixture of equal parts of sugar, salt, and strong vinegar. Don't immerse the metal. Crush salt and sugar to a fine powder before mixing the solution.
ALUMINUM Near-white, matte colors, black	(1) Shake the metal in a solution of 1 tablespoon or more of lye to a pint of water. (2) Immerse in a solution of household dye after a lye dip. Metal may then absorb color and resemble tinted, anodized aluminum. (3) Use Casey's "Aluminum Black" according to instructions for black color.
IRON & STEEL Black, near-black	Heat red-hot and dip in heavy engine or linseed oil. Most cast irons, etched or blasted, will take bluish-brownish or blackish color if soaked or painted with a solution made of 6 tablespoons tannic acid and 1 pint of water. Plum brown can be obtained with Casey's "Plum Brown Cold Gun Finish."
Blue-black	(1) Immerse the metal in a strong photographic fixer solution. (2) Swab with "instant" gun-bluing solution or paste according to the instructions on the product.
Gray	(1) Boil part for about one-half hour in weak solution of iron sulfite. Keep adding chemical at intervals if necessary until metal turns gray. (2) Etch gray with 1 part sulfuric acid and 3 parts water. Protect finish with lacquer.

NOTE: Some of the colored metal samples in the accompanying photos have been sanded after application of the chemicals to re-expose base metal and show the effect. Shades will vary with the alloy, finish, time, concentrations, and temperatures.

Copyrighted material

Proportions of the mixtures are not critical, nor is chemical strength. Experiment until you achieve the effect that pleases you.

Different alloys are affected differently by the coloring chemicals. Varying the strength, increasing the length of immersion, or raising the temperature may produce different results. Brass, for example, will take on many hues. The finish on the metal can vary the shade.

You can have trouble with metals that are not what they seem to be. An article that appears to be brass or silver actually may be plated with a thin coating that will wear off in cleaning. To find out, file a notch in an inconspicuous place to examine for base metal, or check it with a magnet.

Metals must be absolutely clean. Otherwise the finish will not only be uneven, but may not be permanent. Unlacquered brass, silver, copper, and aluminum can be cleaned by buffing with a good metal polish. Swish with a strong detergent to remove grease, and follow with a hot-water rinse. Or clean with carbon tetrachloride—in a well-ventilated place.

Items made from these metals are usually coated with a nearly insoluble lacquer. This must be removed. Try a solvent, or a heavy-cutting buffing compound.

Rust can be removed from iron and steel with brushes, steel wool, or emery-cake compound. If a little etching doesn't matter, soak in a 25-percent solution, by weight, of sulfuric acid in water. This pickling bath cleans in a hurry. Do this job outside.

While the etching processes described make matte finishes, they will not remove scratches and imperfections. Be sure the metal is smooth beforehand.

Protect the finishes. Many processes are simply artificially induced corrosion. The others, like the acid and lye baths, etch the metals bare. All colored objects are subject to further discoloration or rusting. So clean them in very hot water.

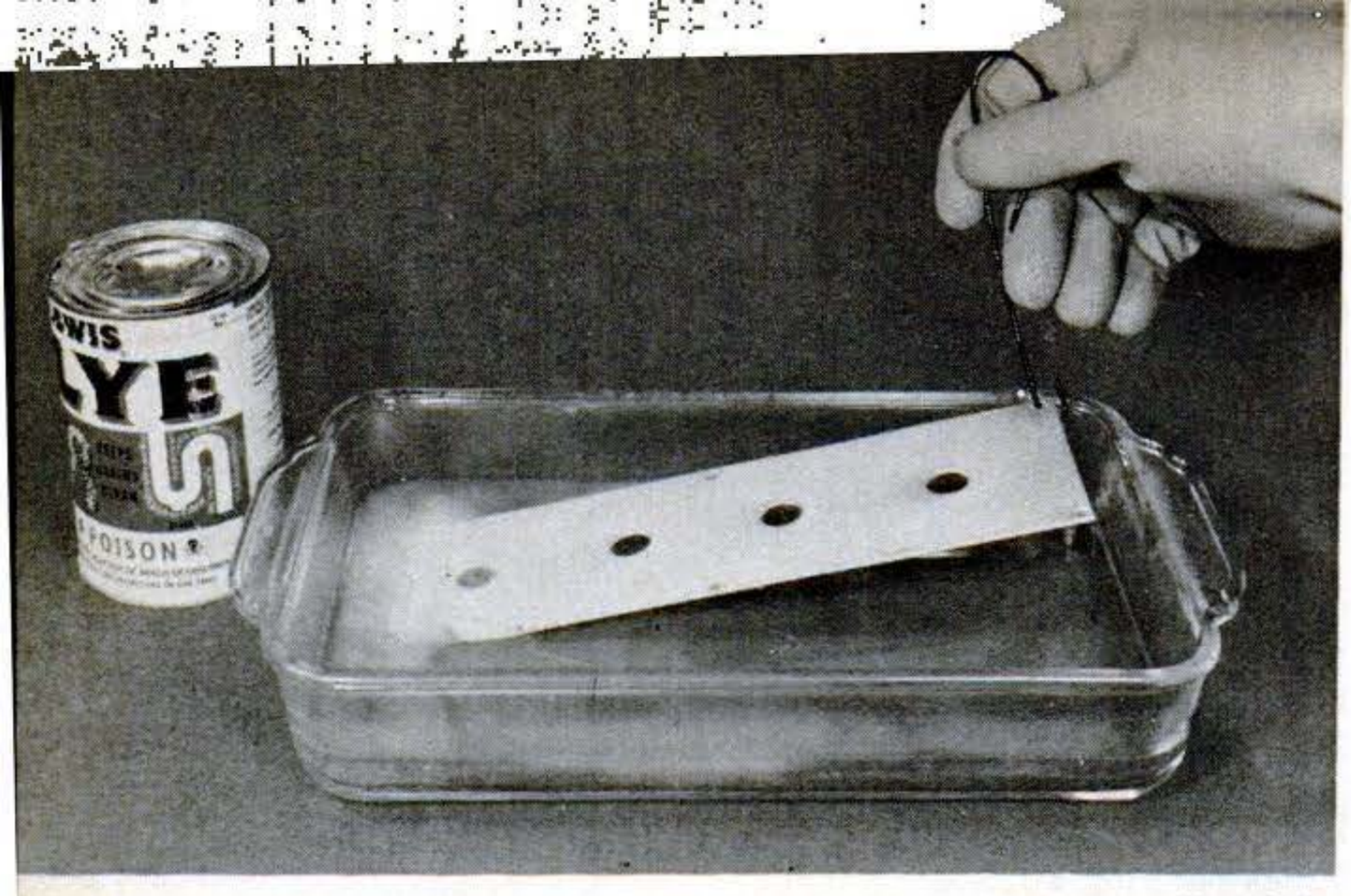
Continued

A blue-black tone for tools and steel parts is easy with gun-bluing. Just swab it on. Heighten color with repeated applications. Wipe on white paint to bring out rule markings.

Daily brushing with a mixture of chemicals will produce a greenish tone on brass and copper, giving a desirable aged **effect. Green comes from oxidation deposits.**

Tones built up on brass are best dried in sawdust after metal has been washed. Do this before touching metal. Some processes leave film. **Remove this with fine steel wool.**

Copyrighted material



A soft-etched finish can be produced on aluminum, like this homemade hi-fi panel, by dipping it in a lye solution. Add color with dye. Use rubber gloves and safety glasses.

Protective black coating can be applied to hardware and small steel parts by heating and dipping in motor oil. Don't use for heat-treated parts; you may destroy temper of the metal.

When metal has a clean surface, after etching action by acids or caustic solutions, apply a coat of thinned metal lacquer to keep the work bright and tarnish-resistant.

Brass, copper, silver, and aluminum objects can be coated with clear metal lacquer obtained from a jeweler. Wax or aerosol clear lacquer work well also. Colored steel tools and hardware should be protected by oiling.

Pieces like the cast-iron trivet and coffee mill shown in the photos react well to wiping with boiled linseed oil. When dry, the semigloss finish is almost timeless.

Colored objects usually look best when shaded with discretion. Let the color be natural for the particular object. Keep these points in mind:

- Greenish, reddish patinas on brass and copper often look best when the coloring is confined to undercuts, depressions, and corners. The coloring will "take" on the entire object. So polish off the high spots, using a loose buff coated with red rouge.
- Even iron and steel objects often look best if part of the coloring is buffed bare, making it appear worn.
- Pseudo-anodizing of aluminum —like the hi-fi panel shown in a photo—can be accomplished by soaking in a household lye solution or spraying with transparent metal paint, available in various shades.
- You can bring out the markings on colored tools by rubbing a slow-drying white paint into the markings. Wipe the entire tool, and the white will remain in the markings.

Play safe with chemicals. Many of the chemicals are poisonous or corrosive, and the acids and lye are toxic besides. All acids should be slowly added to the water, *not* the other way around! Use glass or ceramic vessels for the coloring solutions. Wear rubber gloves and safety glasses. Be careful with carbon tetrachloride.

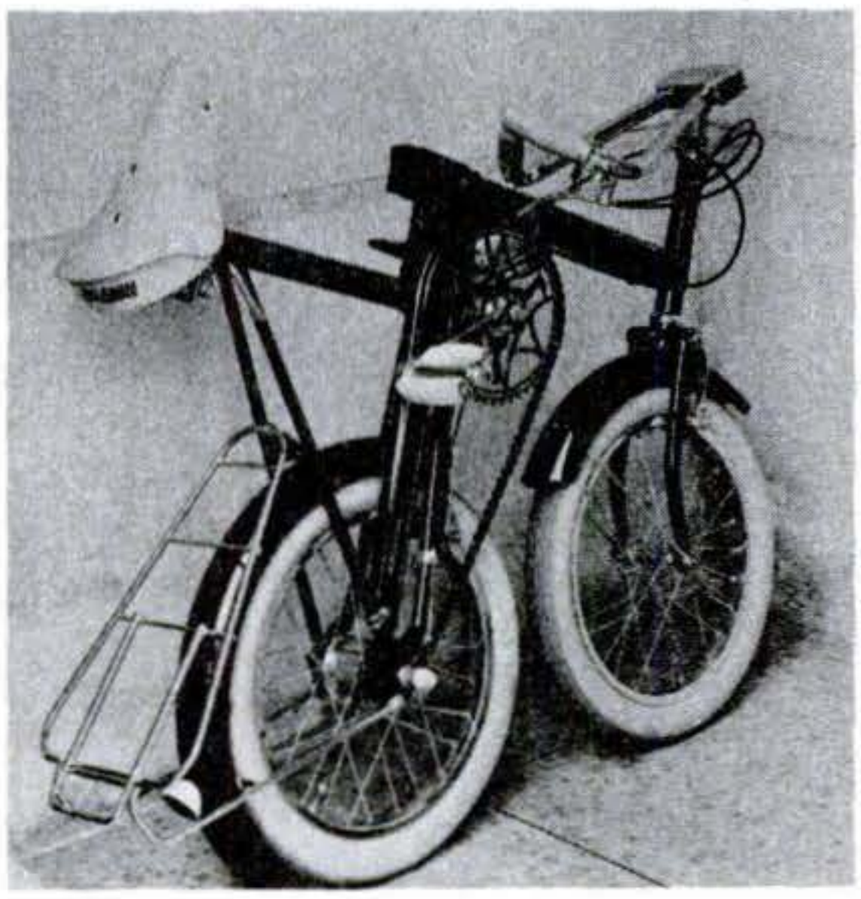
Acid fumes are dangerous, lye toxic, and the others not much better. Use them outside. Dilute and flush the mixtures in a safe place, and don't use the vessels for food. And be sure to keep all work away from children and pets. PS

Copyrighted material

Fish-eye view inside North Sea oil-drilling rig

Dangling like a fly inside the webbed structure of an oil derrick in the North Sea, the man at right is one of the Americans who accompanied the drilling rig on its overseas trip from New Orleans. It was built in this country for a British group seeking oil 10 miles offshore near Scarborough, East Yorkshire, England. The rig can drill oil and natural-gas wells to a depth of 20,000 feet.

Fast, maneuverable small-wheel bike has package rack big enough to hold golf bag.



Compact's 16-inch wheels fold on 15-inch frame to 30-by-38-inch car-trunk package.

Small-wheel bike folds on itself

A fold-up version of the small-wheel Moulton bicycle [PS, Aug. '65] is now being made by Britain's Raleigh Industries. The RSW Compact's front and rear wheels fold toward each other so it can be carried in a car to the golf course or wherever it's to be ridden. Its three-speed gear hub is controlled by a handle-bar twist grip. Raleigh's U.S. outlet is at 1168 Commonwealth Ave., Boston.

License Plates for '66

Something like 78 million U.S. automobiles will sport new (or updated) license plates this year, an annual event that began clear back in 1901.

Some states renew plates with plastic or metal "66" figures. Some stagger renewal dates throughout the year.

ARKANSAS 66
00-0000
LAND OF OPPORTUNITY
CALIFORNIA 1964
CALIFORNIA
CALIFORNIA 1966
SAM 123
00-0000
19 COLORADO 66
PEACH STATE
00-0-0000
19 GEORGIA 66
HAWAII
0A - 000
ALOHA STATE
IDAHO 66
1A 00 000
FAMOUS POTATOES
IOWA 66
0 0000 0
KANSAS 66
SN-00000
MIDWAY USA
19 KENTUCKY 66
000-000
SAMPLE
EXP 3-31-67
AA : 0000
MARYLAND
66 MASS
000-000
MICH 66
SA·MPLE
WATER - WINTER
WONDERLAND
JAN MISSOURI 66
AA0-000
TREASURE STATE
00-0000
MONTANA 66
CENTENNIAL
0-A0000
NEBRASKA 66
LAND OF ENCHANTMENT
0 00000
65 NEW MEXICO
0A-0000
NEW YORK
1966
AA-0000
NORTH CAROLINA
ABC 000
JAN OREGON 66
PENNSYLVANIA
SAM·PLE
RHODE ISLAND 66
SP000
19 TEXAS 66
XXX·000
UTAH 66
AA 0000
0064
SEE VERMONT 66
WIS 66 JAN 65
A00-000
AMERICA'S DAIRYLAND
0 0000
WYO 66
WASHINGTON, D.C.
000-000
3-31 NATION'S CAPITAL 67

STARCRAFT
STARCRAFT

PS BOATING

FUN AFLOAT IN '66

Highlights for '66

Here they are, 25 of the newest and best in boats—a sampling of the finest fleet ever assembled

By JIM ROE/ *PS Boating Editor*

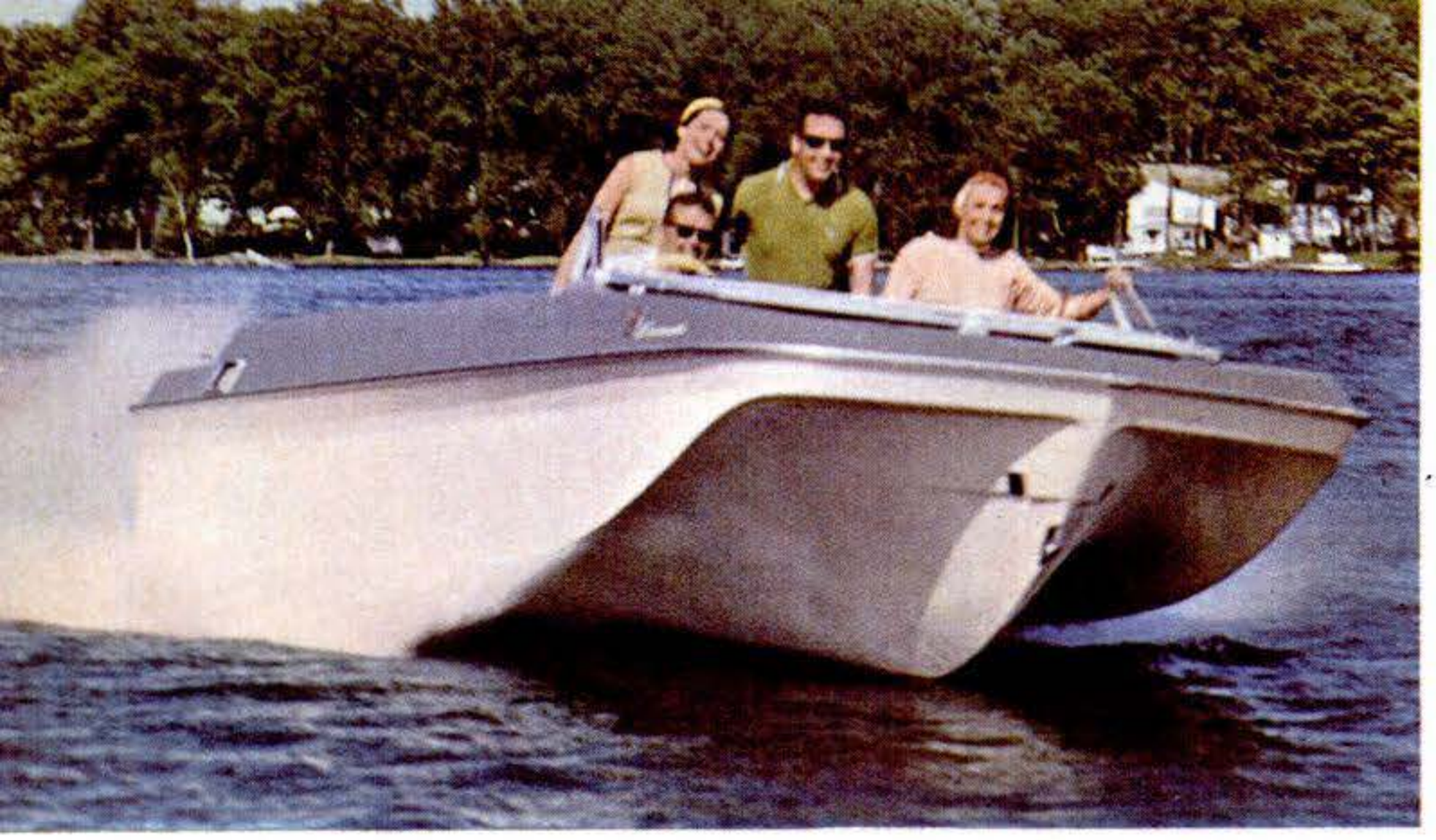
Unequaled variety and quality make selecting a new boat more of a pleasure this year than it has ever been. There is no standard to which you need conform. The size, type, and styling are up to you. And whatever those happen to be, a boatbuilder somewhere has anticipated them and come up with the finished product.

At Chicago's big Marine Trade Show last fall, there were nearly 1,000 boats on display, no two of them alike. I've had the pleasure of running some of those brand-new models. Running them or just looking at them, I've been impressed. You will be, too.

Start an inspection session of your own right here on these pages, keeping in mind that the boats pictured are just a sampling. See more 1966 boats at the show nearest you. While you're at it, go ahead and buy one. They're the greatest.

Seven 1966 boats rendezvous in the foreground—all Starcraft models. Left, just this side of the large cruiser, is the Holiday V aluminum 18-footer. Astern of her is the 21′ Chieftain V aluminum cruiser. Scanning progressively closer, you see the 14′ Skylark fiberglass sailboat, 18′ Holiday V aluminum utility, 18′ Imperial V fiberglass utility, 14′ fiberglass Explorer, and the bow-railed, 16′ aluminum Sportsman.

Copyrighted material



Evinrude's brand-new Rogue is 19′ of gull-winged hustle. Powered by an eight-cylinder, 200-hp. stern drive, she'll hit 40 m.p.h. fast. She's roomy and stable; fine for fishing, skiing, and family boating.

New 15′ Penn-Yan runabout is powered by a 60-hp. MerCruiser stern drive. With two comfortably seated couples aboard, the boat moves right along.

Poloron Hummingbird is made of polystyrene foam. A versatile nine-footer, she is priced at less than $200 with spars, mainsail, and jib.

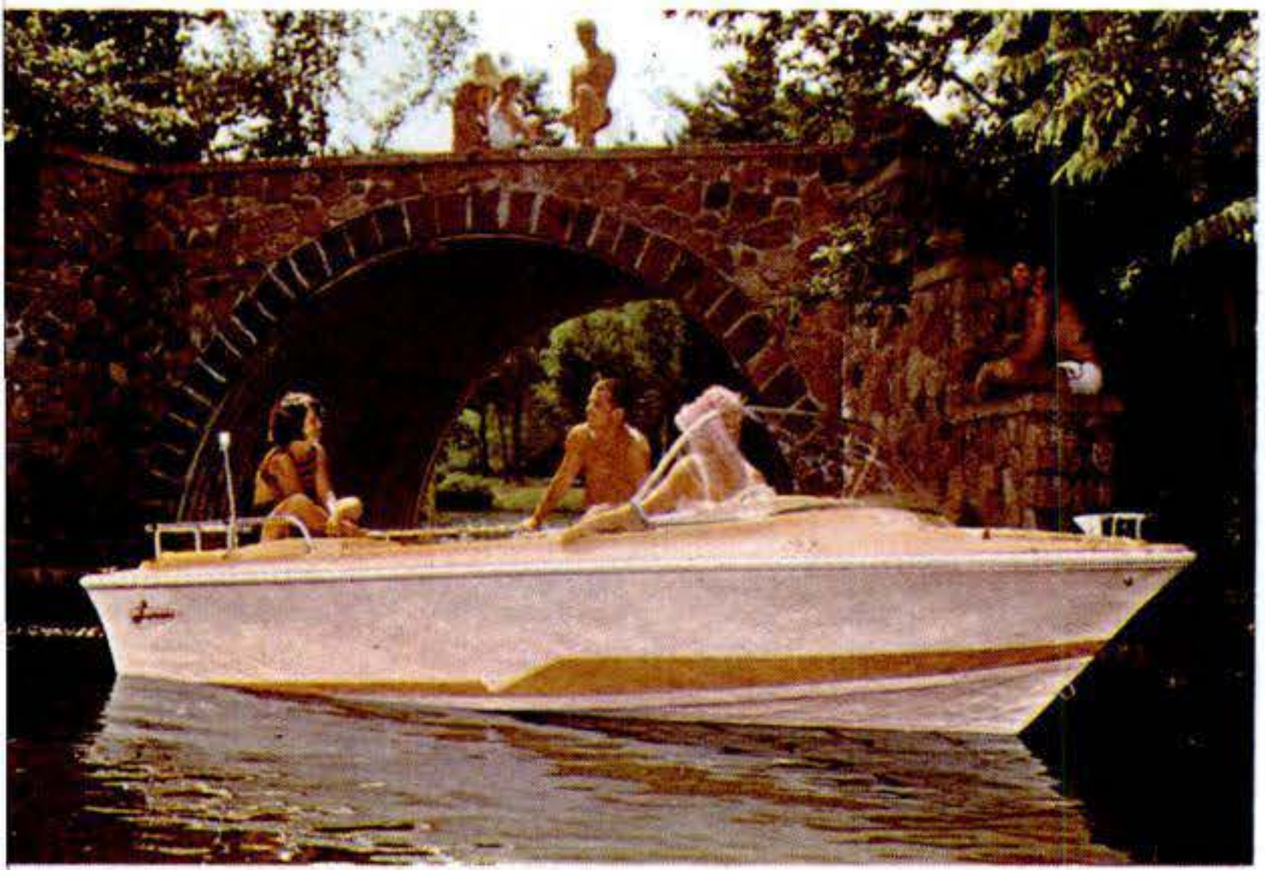
Chris-Craft's new 27′ Commander express has a 210-hp. V-8 engine. Her beam is 10′ 3″ and her cabin contains cruising accommodations for four people. Rich carpeting and upholstery complement walnut paneling.

Johnson Motors' 19′ Surfer comes with 200-hp. V-8 or 150-hp. V-6 stern-drive propulsion. The boat's multikeel hull form makes for exceptional stability in rough water, plus an up-front cockpit and a lot of room aft of that.

Copyrighted material

Owens Empress 30′ express cruiser sleeps a party of six. The cabin contains V berths forward, a convertible dinette, a lounge, a well-equipped galley, and a roomy head. She's powered by twin 225-hp. Flagship V-8 engines.

McCulloch outboard motors propelled these boats to this bank-side picnic site. Special McCulloch features include the Bail-A-Matic boat-bailing system. Motors in the 1966 line range from a new four-hp. model to a husky 75.

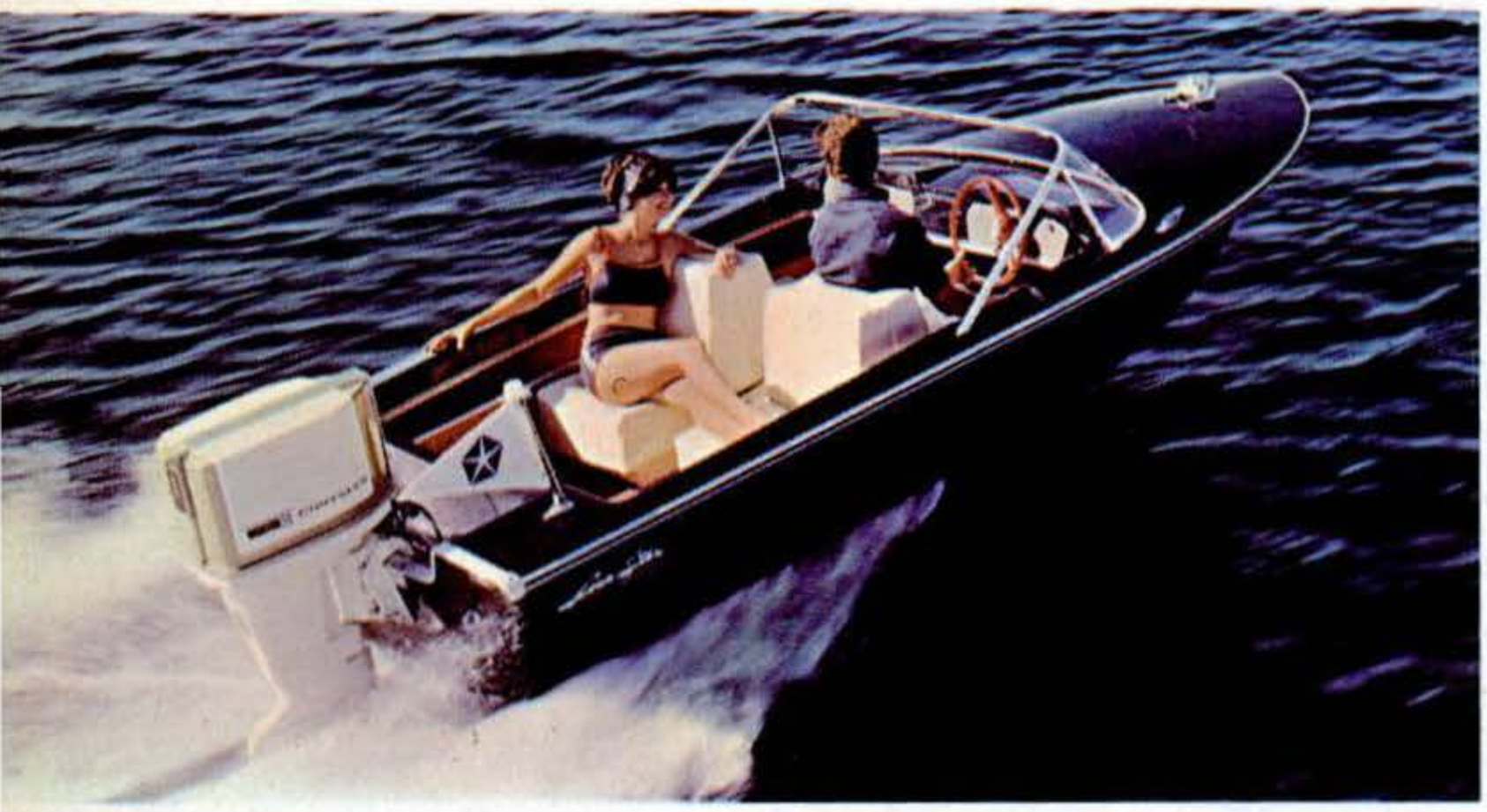


Larson's Medallion 166, a gold-and-white fiberglass 16-footer, comes in outboard and stern-drive models. Standard equipment includes a stereo tape player.

The big River Queen offers you all the comforts of home. Powered by a pair of stern drives, the 38′ houseboat can do better than 30 m.p.h. *Continued*

Copyrighted material

MFG family of reverse-lap-strake fiberglass boats adds up to seven for 1966. You see three of them above—the 14′ 4″ Niagara Custom (in the foreground), the 15′ 8″ Westfield Custom, and the 17′ 9″ Erie Custom.



Chrysler's Lone Star Mustang is 15½′ of get-up-and-go. She's a quad-chine fiberglass model, and there's 75 horse-power in that Chrysler out-board motor on her transom.

Lund Metalcraft's Little Fisherman, a 12′ aluminum utility, weighs 120 pounds. She has a 660-pound load capacity and handles outboards of up to 10 hp.

Winner Boats' 14′ 9″ Cobra, below with a 60-horse MerCruiser stern drive, is also offered in an out-board model. She's a fiberglass boat with 73″ beam.

Traveler's Neptune (above) does better than 40 m.p.h. with a 150-hp. stern drive for push. A fiberglass 19-footer, she'll handle up to 310 hp. Her comfortable seats make up into man-sized berths for sunbathing or sleeping.

Turbocraft's 18′ Bolero is water-jet-propelled by a two-stage Buehler jet that delivers up to 1,300 pounds of thrust. The fiberglass hull has built-in foam flotation.

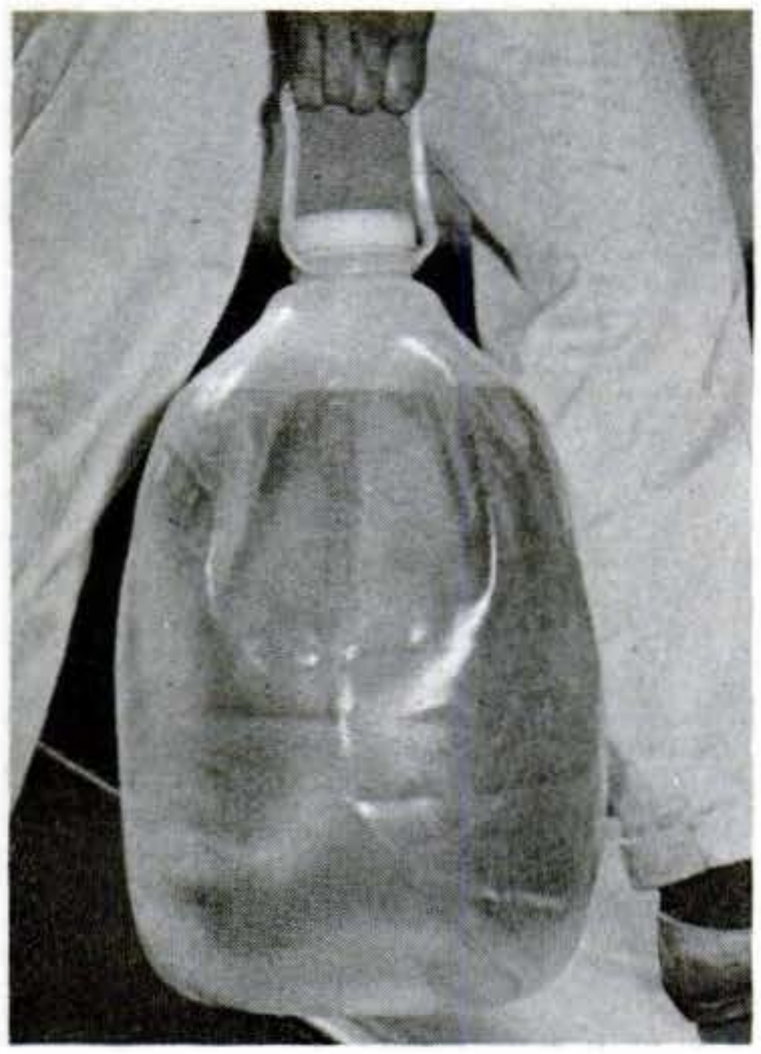
Aluma Craft's 14½′ Maracaibo weighs an easily trailered 448 pounds. An aluminum boat for outboards to 50 hp., she'll carry 1,070 pounds.

Glastron's 17′ V-174 fiberglass boat comes in 110- and 200-hp. stern-drive models. Her deep-V hull is highly maneuverable, gets up on plane fast. PS

What's New in Boating

New drive unit adapts kart engines to hydro-karting

Kart owners can put their engines to work afloat by mounting them on a new hydro-drive unit. Shown above packing a McCulloch kart engine, it has an adjustable-tilt mounting bracket and can be raised or lowered to put the prop where it will push fastest or give best maneuverability. The 16-pound drive, less engine, sells for $149. Made by Hydro-Meteor, 438 Calle de Felipe, Torrance, Calif.

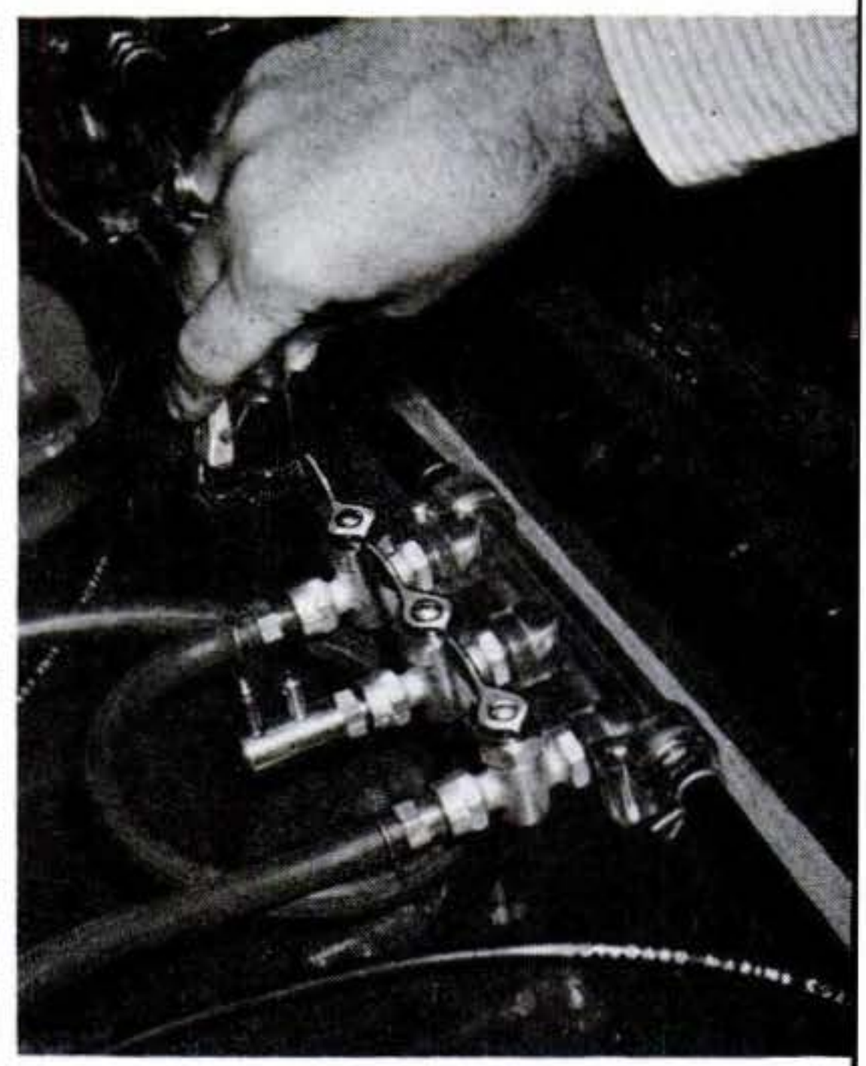


Jug stows flat when empty

Lug-A-Jug holds five gallons of water in easy-to-tote-and-stow fashion, yet takes up almost no space when not in use. The container is made of semitransparent polyethylene plastic, has a screw-on top, and is fitted with a strong, comfortable handle. Empty, it weighs a half-pound, and flattened, it is less than two inches thick. Made by Dewitt Plastics, 9 Aurelius Ave., Auburn, N.Y., it is priced at $2.19.

Refrigerator uses stored cold

This hull-contoured boat refrigerator runs overnight on 115 volts AC at dockside, building up a reserve of cold. Unplug it, cast off, and count on it to do its job at sea for as long as 48 hours. It even continues to make ice cubes. The secret? A tank of special fluid stores and releases cold the way a battery does electricity. General Thermetics, Inc., 174 Marine St., Farmingdale, N.Y., makes it. Price: $399.



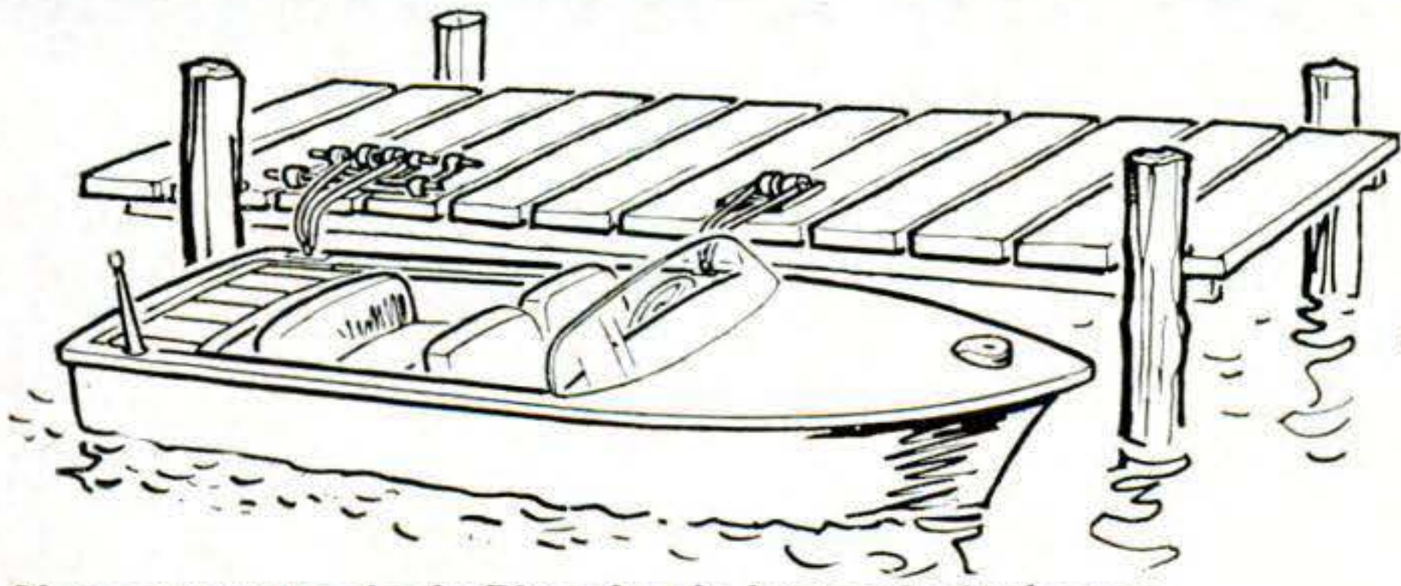
Block centralizes fuel control

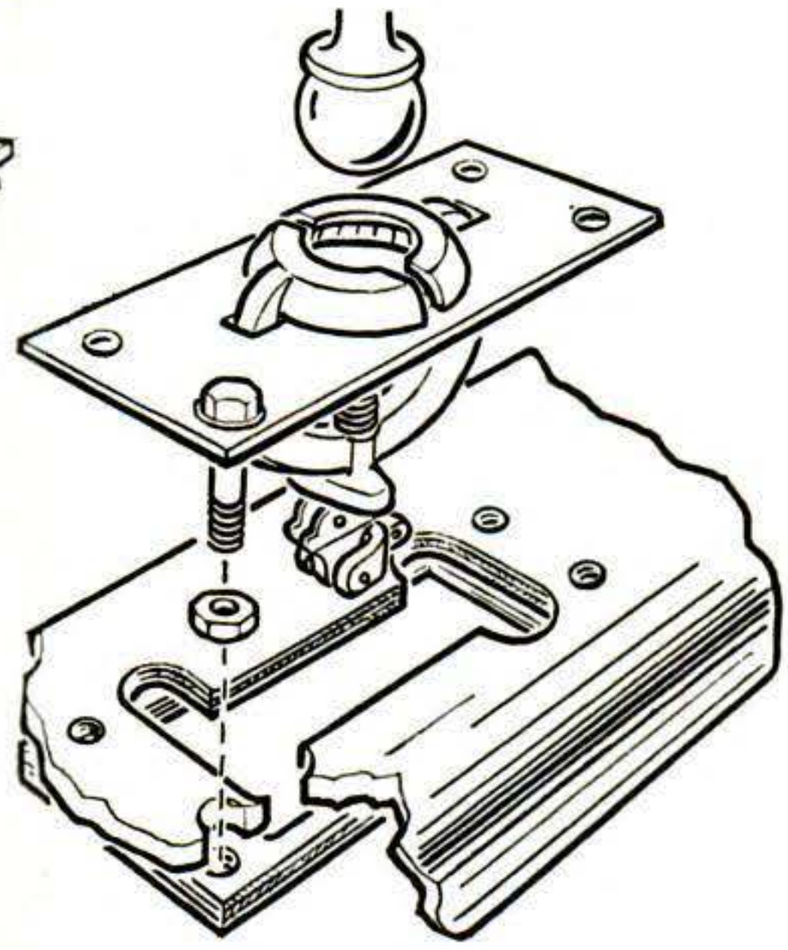
Hook up any two or three fuel tanks to this transparent plastic control center and you can see at a glance whether or not fuel is flowing, and switch from one tank to another at one location. Called the View-Flow, it adapts to all fuel-line fittings and is useful with inboards, stern drives, or outboards. Made by Tempo Products Co., 6200 Cochran Rd., Cleveland, Ohio, the multiple-tank fitting costs $3.95.

Copyrighted material

Pontoons for vacation trailers

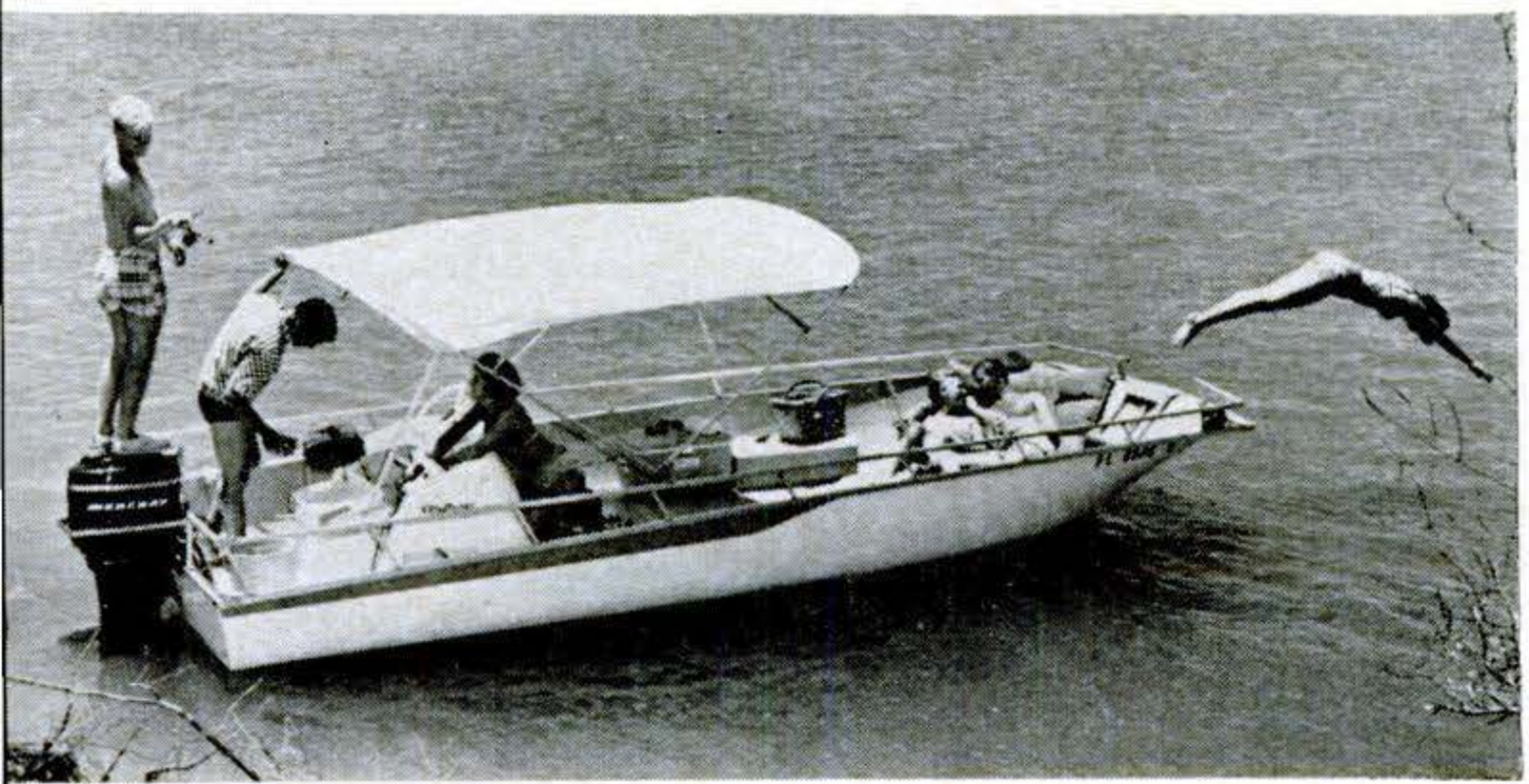
Vacation trailers up to 18′ long double as a houseboat when equipped with this catamaran conversion outfit. A pair of 22′ plywood pontoons filled with foam flotation material swing down on arms that lock against the trailer body. After you launch, a hydraulic lift raises the trailer to pontoon-deck level. There is a hinge-down stern deck, bracketed for an outboard motor, and a hinged foredeck for mounting controls. Prices range up to $1,500. Trail-Or-Floats, 4242 N.E. Alberta St., Portland, Ore., is the maker.





Newest way to dock: Plugging in instead of tying up

Ease your boat up to the dock and secure her by plugging a pair of ball-tipped mooring arms into sockets (right) in the side deck. Free the boat for action by pulling a release lever near the steering wheel. Priced at $135 a set, the system is made by Moor-O-Matic Co., Spirit Lake, Iowa.



Fast outboard boat is all deck

Although she doesn't look it, the fiberglass boat at left is exceptionally fast and efficient. She's 19′ 8″ long, with 8′ 10″ beam, and handles outboard motors of up to 110 hp. Called the Ski Barge 20, she turns on a dime, is dry in a chop, and has more usable deck space than any other stock boat of her size and ability. Cost: about $1,100. Motor and sun top are extras. Kenner Boat Co., Knoxville, Ark.

Copyrighted material

PS BOATING

FUN AFLOAT IN '66

Boat Camping

Make the most of your boat. Use her as your weekend and vacation home. Eat and sleep aboard, or take a tent and set up camp along the shore

By JAMES PATRICK

Boat camping combines the best of two great outdoor activities—camping and boating. It's enjoyed by fishing buddies who go for the idea of fishing into the night and starting again at the crack of dawn. It's enjoyed by families. Children take to it in a big way, pick up valuable experience, and learn to love and respect nature in a way that sticks. It's fun. It's healthful. It's inexpensive. And you can do it with just about any boat.

By the time you've boat-camped half-a-dozen times you will have assembled, in easy stages, all the equipment you'll need. From then on, you'll reap dividends in reduced weekend and vacation expenses. Your boat, or the tent you've stowed aboard, is your motel, wherever you happen to be. Spend weekends and whole vacations away from the hubbub of overcrowded resorts, beyond the reach of greedy merchants. Or, if you prefer, hop from marina to marina, or make the rounds of public waterfront camping areas offering such conveniences as hot water, showers, tennis courts, heated pools, hot dogs, and daily papers.

The key pointers for a smooth start:

Allow extra time. Make a generous time allowance in scheduling your arrival at a new campsite or anchorage, since you'll not only be hungriest then, but also faced with the task of preparing for the night. If something is wrong where you planned to stay, it will take time to find an anchorage or campsite that is suitable. And hunting for a site isn't easy in the dark—or pleasant on an empty stomach.

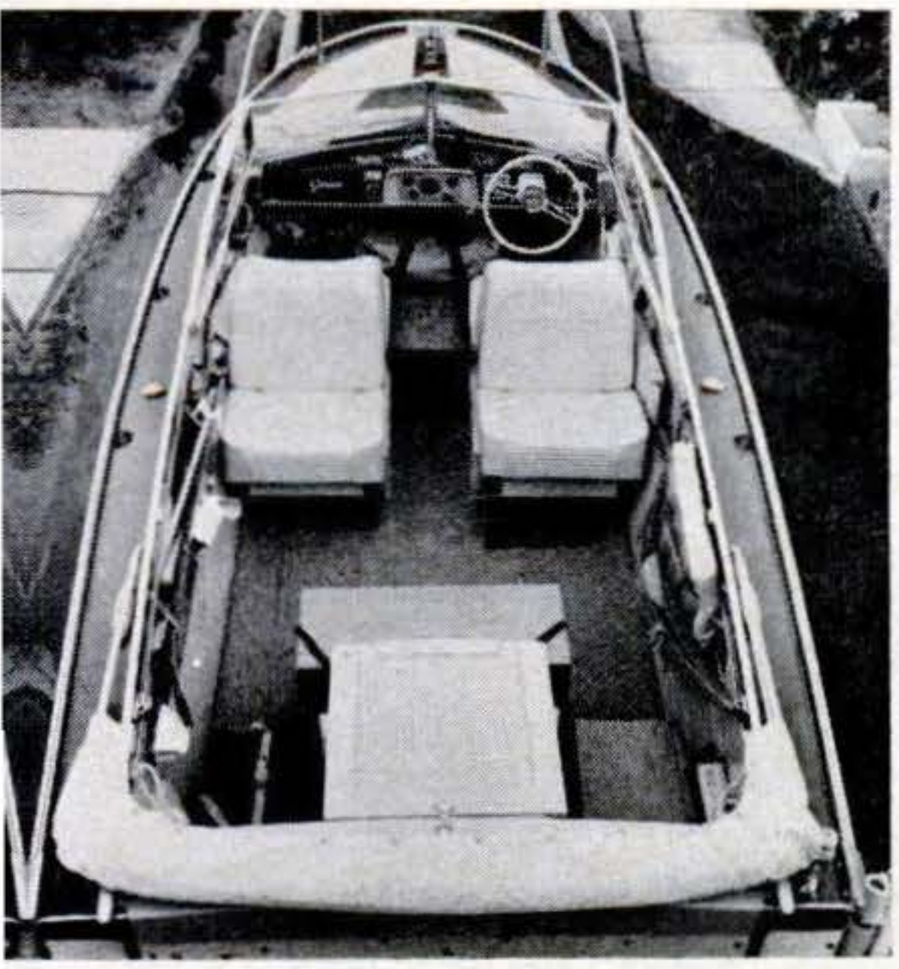
Know what to take. The day before we left on our first trip we assembled in the

Continued

Copyrighted material

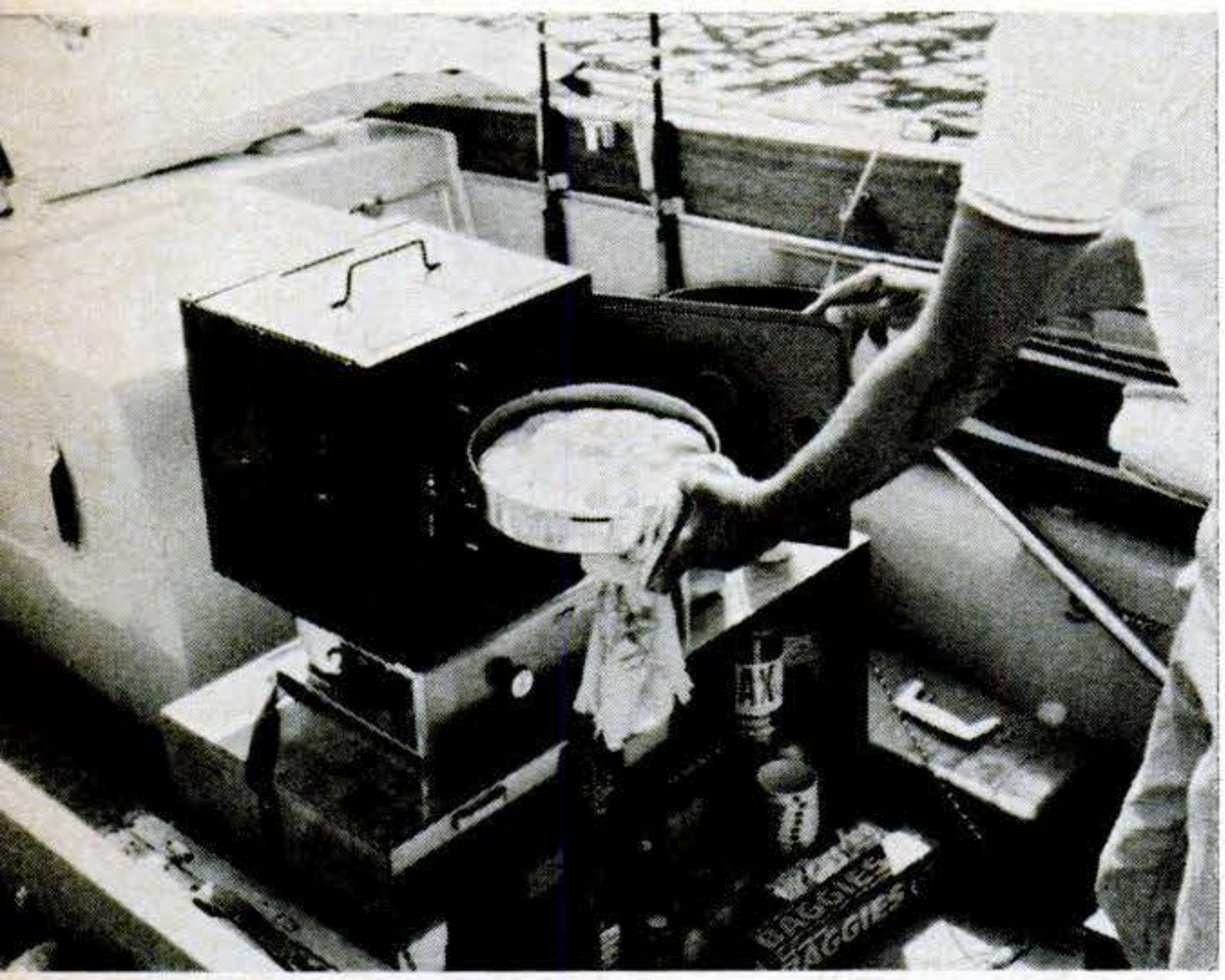
Doubles Your Pleasure

Travel horizons are unlimited if you have a trailerable boat with stowed or convertible living accommodations. The author's 17½-footer (below) has some of each.



Seats are bunks. Blankets and pillows, as shown at right, come out of a zipper bag, and a convertible top, back cover, and curtains will enclose the cockpit bedroom.

Swim fins and dock lines stow out of sight in underseat bin. Beneath bin, shock cord lashes overnight bag. In boat camping, mastering the art of orderly stowage is a must.



Boat-camping bill of fare is as diversified as the provisions you take along or can catch on the spot. Here a batch of biscuits comes out of a folding, stove-top, roast-and-bake oven.

Chest for cooking gear and staples promotes clear decks and quick meal-getting. This one even has a cubby for paper toweling. Stove and pans can be put into action in seconds.

back yard everything that we were going to take along. It was a formidable display. Yet when we dropped anchor 30 miles from civilization the following day, we found we'd forgotten soap, toothpaste, and bug spray. So, make a list of things you'll need, and see that all items are aboard when you leave the dock.

An odds-and-ends list of things that might be overlooked could include suntan lotion, mosquito repellent, folding shovel, extra mantles for lanterns, clothesline, flashlight, first-aid kit, scouring pads, matches in a jar, paper towels, extra blankets, toilet paper, towels, and aspirin. A list and a last-minute check spare you the inconvenience of doing without.

Gear up for comfort. At the very outset of your boat-camping career, outfit as best you can for comfort aboard or ashore. If this calls for the acquisition of a boat top and enclosure curtains, a tent, or air mattresses, buy these items. Convertible seats that make up into lounges are a welcome advance in small-boat outfitting. Many new craft come with them and are ready for sleeping aboard. Small air mattresses can be set beneath the foredeck or between the seat berths for children.

In lieu of convertible seats, full-size air mattresses on the cockpit floor solve the adult bed problem. They're comfortable and, deflated, take up next to no space. If your boat isn't big enough to sleep aboard, then a tent is the answer. Set it up within stone's throw of the water.

Sleeping bags are a good idea in places known for dampness and sudden temperature drops. However, most boat campers get by nicely with blankets. A good trick to remember, and to be equipped for when you wish you had an extra blanket, is using clear-plastic sheeting as an outer cover. The inexpensive dime-store variety is fine. In a pinch, the plastic alone will give you a passably warm night's sleep, even in 50-degree weather.

Stow systematically. Put each item so it's out from underfoot, yet accessible on a moment's notice.

Copyrighted material

Accompanying photos give you an idea of how it's done. An assortment of zipper bags will help. Keep toiletries in one, rain clothes in another, and allot one to each crew member for personal belongings. Clear-plastic zipper bags are good. Decide upon a regular stowage spot for each bag, box, and boat-camping accessory, and put them back there every time.

You'll also find that it pays to stow things securely. Wind-whipped water can send ice chests, stoves, and other items sliding and banging about if they aren't tied down or chocked in place. Screw-eyes and cup hooks in convenient places adapt your boat for easy tying down. Light lines make good ties. Nothing beats lengths of ¼-inch to ⅜-inch shock cord with hooks on either end.

Eat like a king. Thanks to compact stoves and nesting cookware, plus developments in dehydration and refrigeration, you can enjoy meals ranging from simple to elaborate with little effort. Drop by our boat for breakfast, and you'll be handed a plate loaded with eggs and sausage, hot rolls or freshly baked biscuits, and coffee or milk. The biscuits we use are the refrigerated type, ready for the cooking pan which slides into our folding oven.

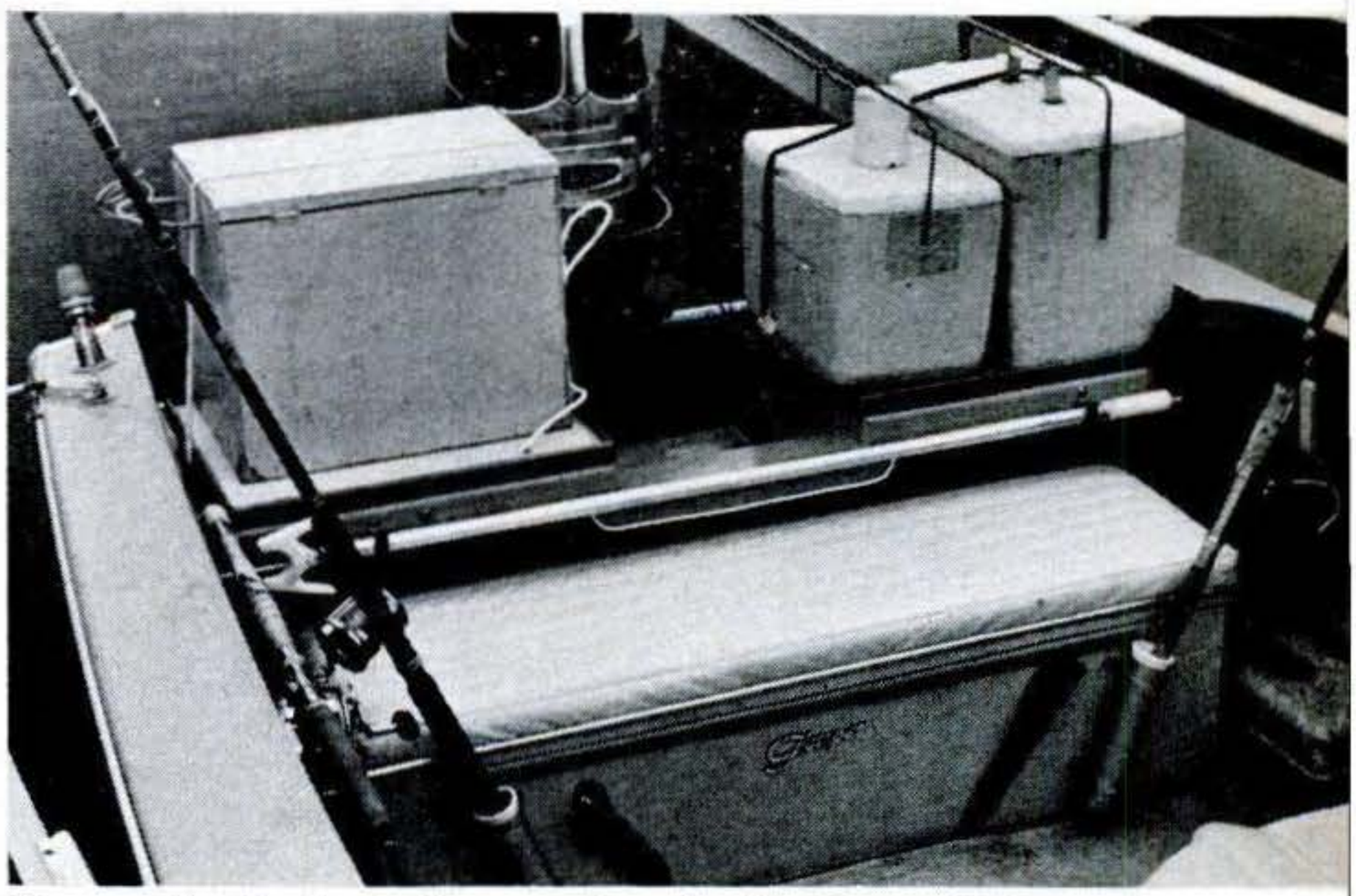
Our lunches prepare quick as a wink. They're sandwiches with standard fillings—cold meats, peanut butter, or whatever—and apples, peaches, or other fruit for dessert.

For dinner, if the fishing's been good, you know what the main course is. However, even if they bite every day we carry along steaks for broiling—enough for two meals. Sizzling T-bones, green salad, and French bread toasted on the grill after the meat is done, make a mighty satisfying windup of a long boating day.

Disposable paper plates and cups spare us home-style clean-up chores, and paper towels do the work of dishcloth and kitchen towels in dealing with pans and other nondisposable utensils.

Boat-camping life is the best. Find out for yourself. PS

A little snapping and zipping converts open boats into cabin boats for restful nights at anchor in places accessible only to boatmen. Above, the author prepares for just such a night.



The smaller the boat, the more imaginative the outfitting and utilization of space. Boat camping inspired the practical use of an outboard boat's splash-well area, as pictured above.

Inexpensive foam-plastic food coolers and rectangular plastic liquid containers are fine for boat campers. The coolers below have drains. Note that they empty into boat's scuppered well.

Chrysler's boating lineup covers a good bit of Texas real estate in this photo. Three kinds

Chrysler Enters

By JIM ROE / *PS Boating Editor*

Suddenly an auto maker is building more things for boatmen than anybody else. Outboard motors, stern-drive propulsion packages, inboard engines, aluminum and fiberglass powerboats, sailboats, trailers—you name it, the Chrysler Corporation makes it.

The Chrysler name is no newcomer to the marine field. Ever since 1927 there has been a full line of Chrysler inboard engines for medium-size and large powerboats. But 1966 is the first year in which every active small-boat sailor will see the

Copyrighted material

of power units, a fleet of boats, and a line of trailers, all carry the same name.

Boating's Big League

Chrysler house flag out in the open on his home waters.

I've talked to fellow boatmen, marine dealers, and Chrysler Marine General Manager Bob McCurry. These talks prompt me to make the following four-point forecast:

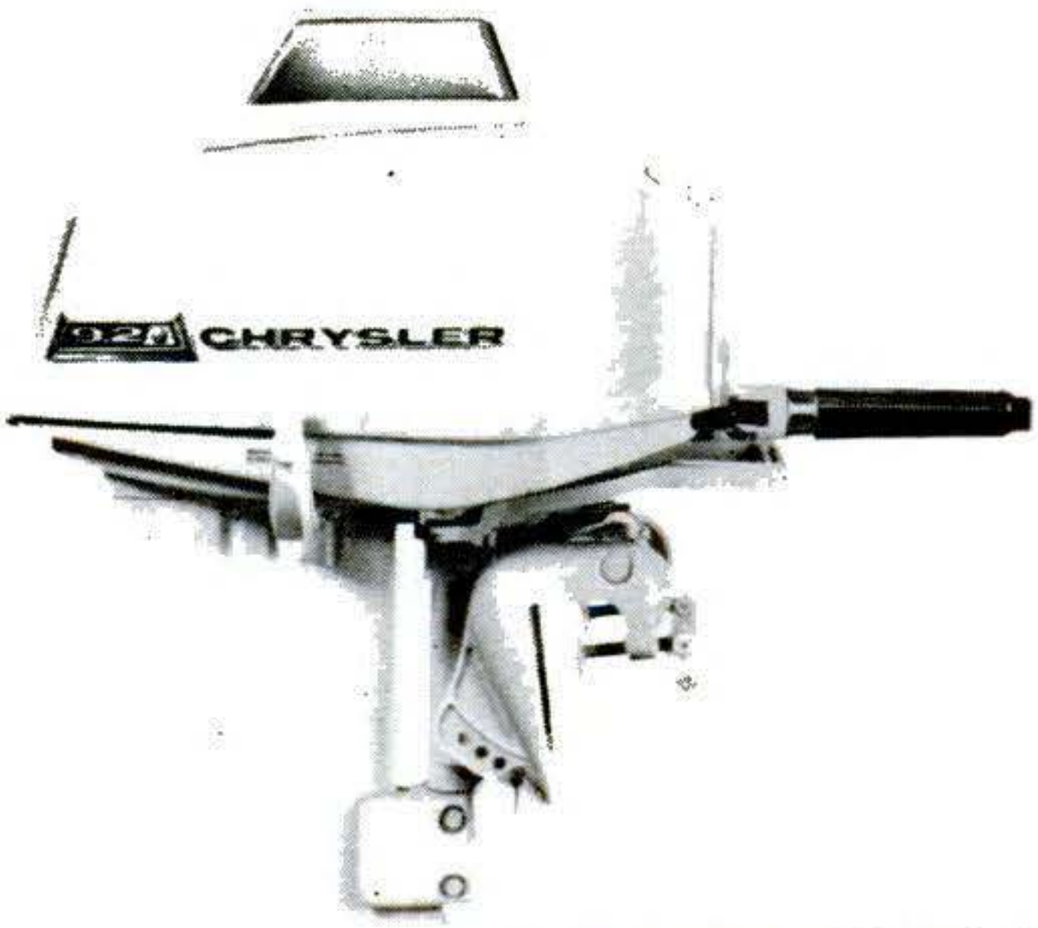
1. We're going to see changes in boat styling and interior appointments, such as seats, cockpit liners, and stowage facilities. Chrysler is busy on them.

2. We'll be offered more complete boating outfits. Chrysler marine dealers will offer boat, motor, trailer, and necessary gear as one ready-for-the-water package. The boats will be as ready for

Continued

Copyrighted material

A complete package Chrysler plans to offer is shown above. It would include an aluminum or fiberglass boat; outboard, stern-drive, or inboard power; convertible top; and a full line of basic equipment.



A 9.2-horse outboard is the newest Chrysler Marine product. Called an Autoelectric, it features turn-key starting and a built-in, 360-degree stern light (that dome protruding from the top). It's the first electric-start outboard of its size.

launching as a car is ready for the road. And buyers won't run the risk of winding up with a mismatched hull and motor, or a trailer that isn't right for them.

The beginning boatman will be able to take to the water confident that he has at least the required minimum of equipment aboard for both convenience and safety. These ready-to-go powerboat packages are being assembled by expert marine engineers, with none of the guesswork that too often goes into the outfitting of a boat.

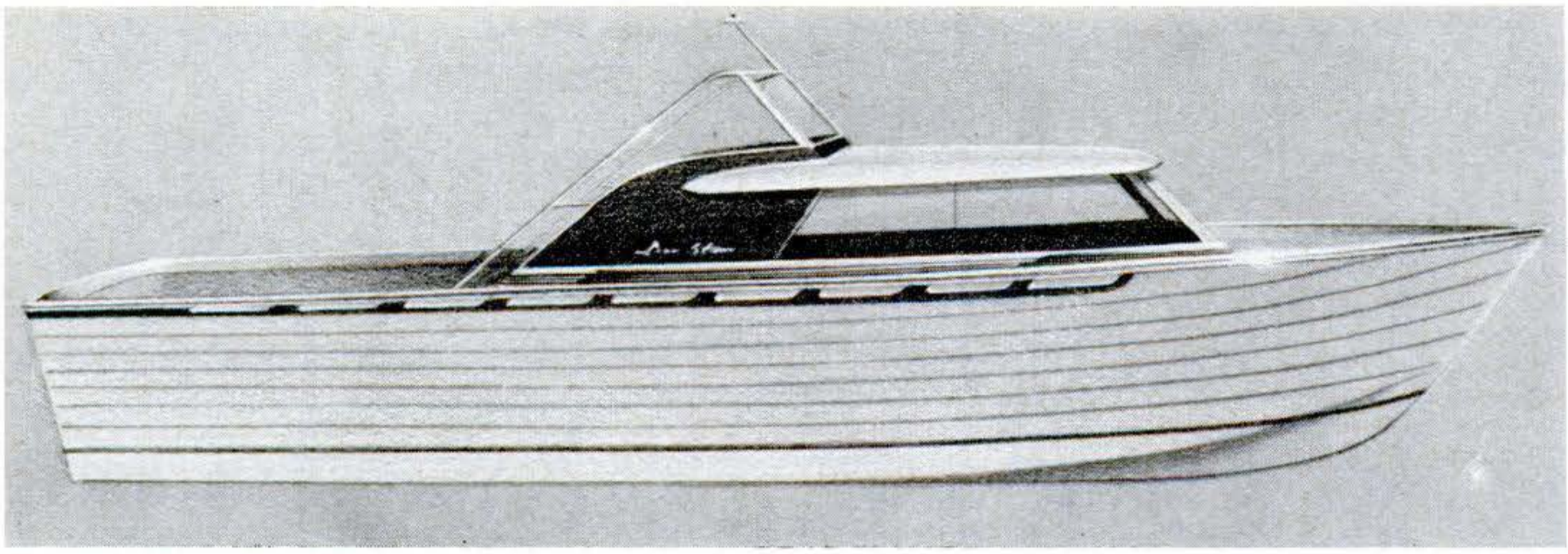
3. We're going to see some new marine dealers. Boats won't appear in every Chrysler auto dealer's showroom. But it's my guess that quite a few of these dealers, among them many knowledgeable boating enthusiasts, will soon offer water as well as land vehicles. There are also hints of automobile-style leasing and financing plans.

4. Parts and service won't be problems. The Chrysler people see a great opportunity for their dealers to be of assistance to boatmen by stocking a good supply of parts, and by being set up to service any portion of the boating outfit.

Combine these four predictions with the production and distribution capabilities of a major automobile company and the writing on the wall spells more pleasure and fewer worries for a lot of American boatmen.

Already more than 38 million Americans participate in pleasure boating. And there are some eight million boats in the fleet.

Yet those of us now on the water can count on being joined by more and more of our neighbors in the coming years. Chrysler hopes to supply equipment and service to the growing armada in such fashion that the Chrysler name will be as well known on America's waterways as on its highways. PS



Chrysler Lone Star 24-footer, shown in preview above, is slated for production soon. She's the Cruise Liner III, designed for engines of up to 150 hp. and live-aboard comfort for four persons.

Copyrighted material

New, fabric-backed mahogany veneer sticks to wood, fiberglass, and metal boats for easier sprucing up, alteration, and restyling

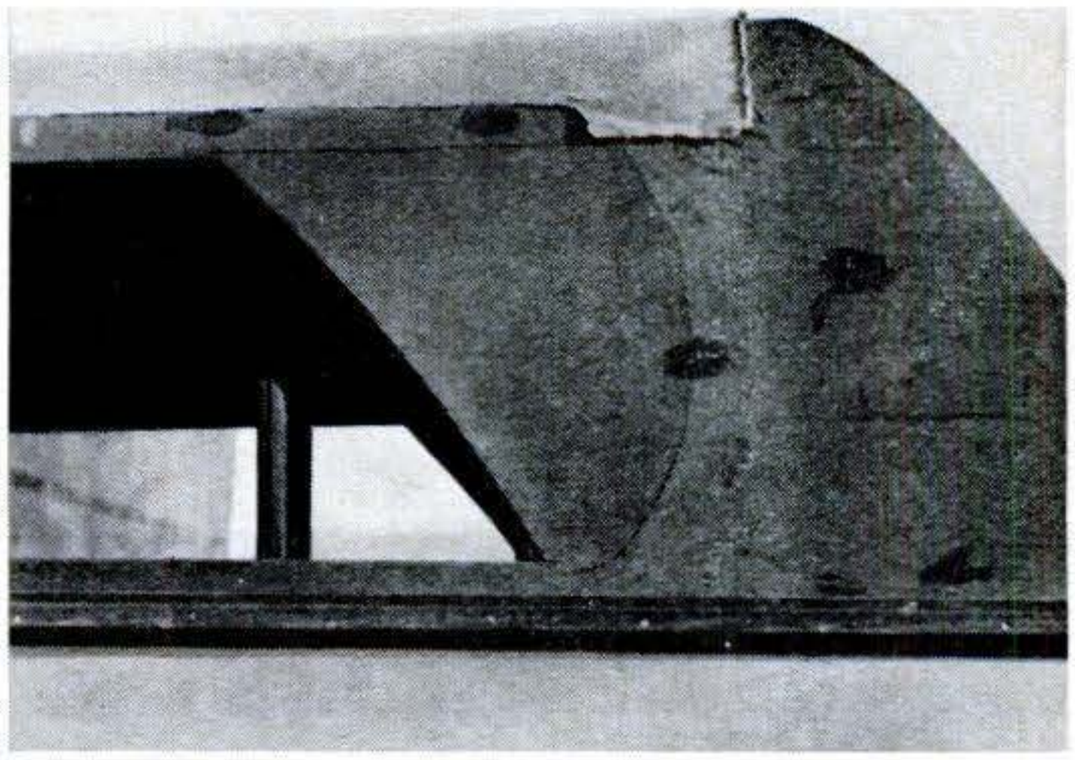
Instant Mahogany for Boats

You can dress a split or discolored hatch in a new, natural-wood skin. Or give an all-fiberglass boat a traditional flavor by making some synthetic surfaces wooden ones. Or restore interior and exterior mahogany without the bother or expense of all-out refinishing. Or convert painted bulkheads into gleaming mahogany in a day, without removing the paint. You can do any of these things—and more—with Wood-Up.

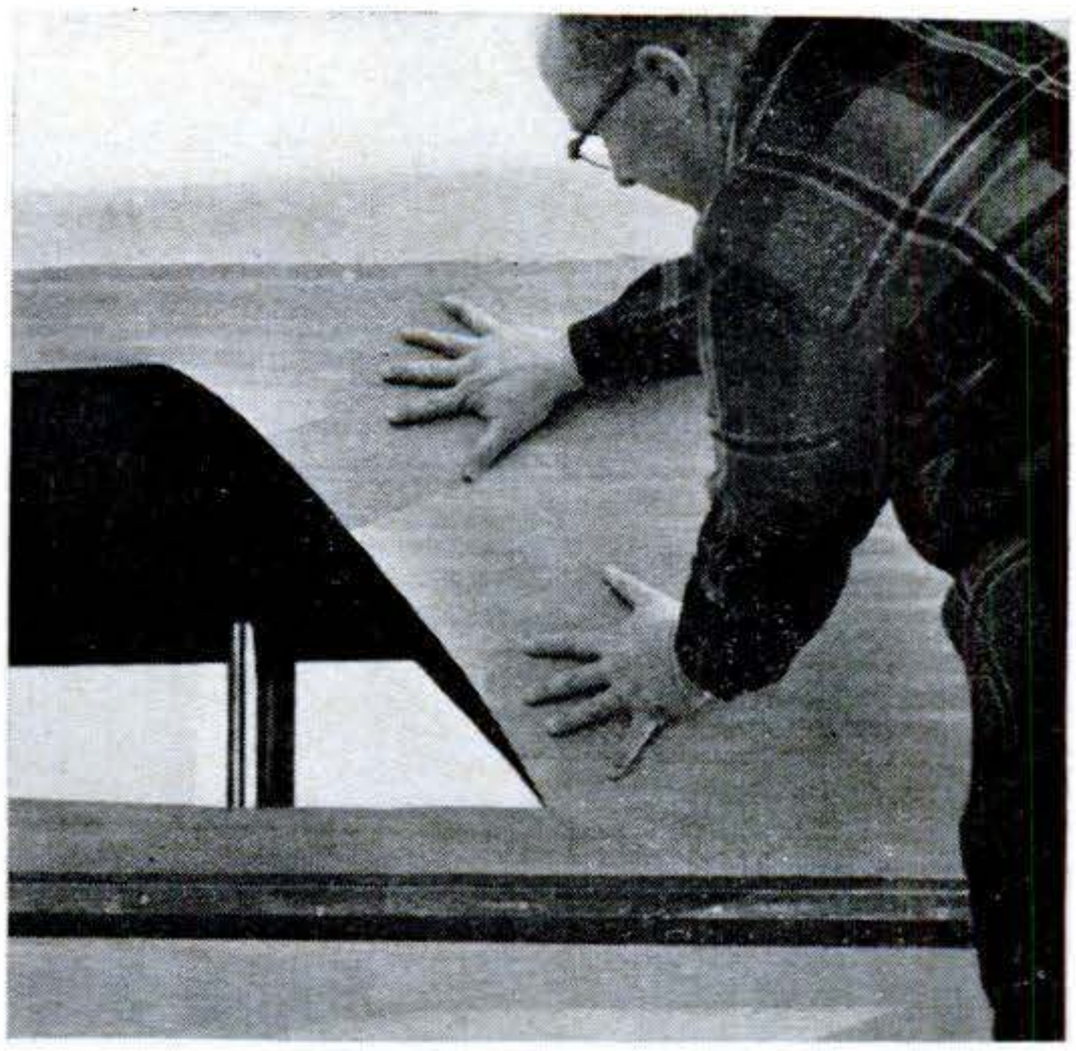
Wood-Up is a ribbon-grain Philippine-mahogany veneer, resin-glued to fabric. The backing lets you handle it like wallpaper without splitting the veneer; you can even wrap it around a pencil. Brush-on contact cement makes it part of the boat.

To apply it, you coat the back of the Wood-Up and the boat surface with contact cement, and wait two to three hours for the cement to get tacky. Then, with kraft paper behind it (to keep the cemented surfaces from meeting), position the Wood-Up with pushpins. Remove the paper in easy stages and smooth down the Wood-Up with a photoprint or wallpaper roller. Once on, all it needs is varnish for a finishing touch and protection.

The new material comes in rolled 2′-by-8′ sheets and costs $3.20 a lineal foot. This seems high only until you see the results and tally the time it takes you to get them. H. A. Calahan, Inc., 859 Mamaroneck Ave., Mamaroneck, N.Y., makes the stuff. The firm also makes marine varnish, paint that stops leaks, marine adhesive, and a liquid-plastic formulation that makes dry-rotted wood firm again. So the new material is part of an interesting line of special cover-ups for pleasure boats.—*George Daniels.*



Altering the shape of cabin windows with inserts (above) updates an older cruiser. But ordinarily the joint is hard to hide. Not so with Wood-Up covering.



A whole cabin side gets a new, uniform exterior here. A clean surface, waterproof contact cement, and a few coats of varnish are all Wood-Up needs.

Copyrighted material

The WANKEL ENGINE Goes to Sea...

PS BOATING

FUN AFLOAT IN '66

. . . in a unique way. A month ago you couldn't buy a Wankel that wasn't in an NSU car or a six-foot Ski-Craft. Now you can get 8.7- to 21-hp. units for boats—with transmissions that hook up to propellers with hoses instead of a shaft

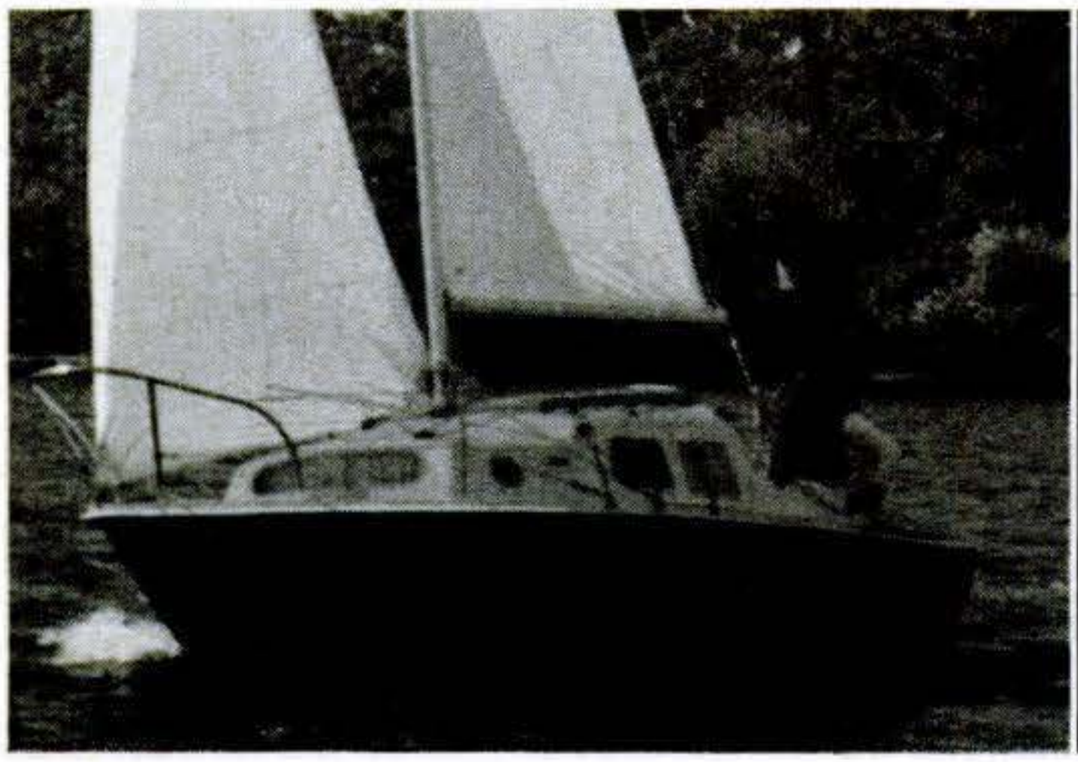
By DICK BORDEN

Felix Wankel's engine is full of surprises. The latest is its stateside debut as auxiliary power for sailboats—when it's the powerboat men who have been anxiously waiting for it here. Yes, you can now get Wankel marine propulsion without smuggling it in or buying some exotic vehicle packing the rotary-piston engine. It won't be cheap ($995 to $2,000, depending on horsepower), but the importer says he can have a complete system on your doorstep by April. Right now, all incoming stock is going to sailboat builders. Accompanying the engine will be a British-made hydraulic-marine drive you can install yourself by drilling three holes in your boat.

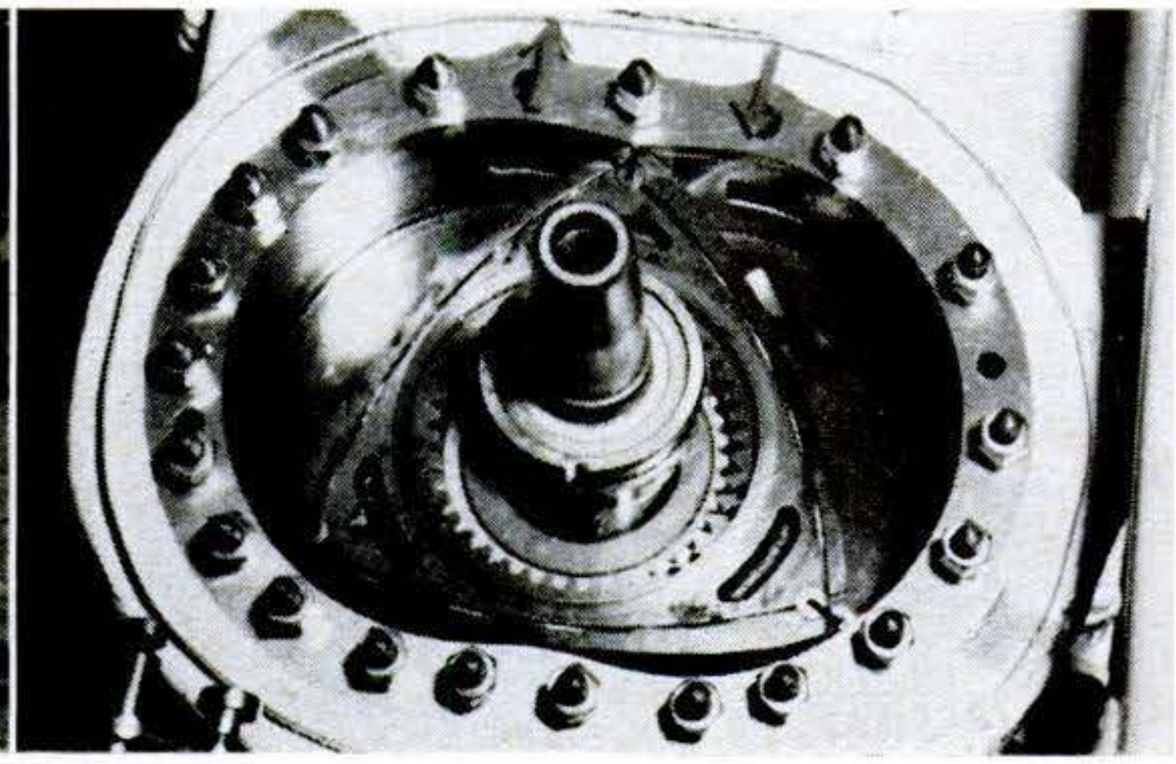
In a way, the hydraulic drive is as interesting as the three available Wankel engines (8.7, 12, and 21 hp.) made by NSU in Germany. Fairey Marine, Southampton, England, makes the drive. Rotomotive Industries (9052 Seward Park Ave. S., Seattle) sells the package. That's the firm that has been importing the Ski-Craft, the Wankel-powered 9′ water-ski towing craft that looks like a water-going lawn mower. You grasp the handlebars containing built-in controls, and you're off, water skiing on your own at speeds of up to 31 or 32 m.p.h.

Lightness and compactness are the big appeal of the Fairey-Wankel marine-propulsion unit. Plus the fact that the engine and power pack, linked by a 2:1 reduction gear, can be installed anywhere. You could put the machinery in the bow if you wanted, and install the propeller gearbox in your boat's keel instead of on her bottom. The hydraulic drive uses S.A.E. 10W-30 mineral-base engine oil. If you're not familiar with how the Wankel engine works, refer back to the Mar. 1960, Feb. 1964, and Jan. 1965 issues of POPULAR SCIENCE.

First Wankeled U.S. stock boat is the Tylercraft 24′ fiberglass cabin sloop below. She has an 8.7-hp. Fairey-Wankel auxiliary and costs about $5,200.



Wankel innards consist of three double-duty chambers: compression-combustion, bottom; combustion-exhaust, left; induction-compression, right.



Copyrighted material

The Wankel's transmission is vibration-free, shifts without gears

SCHEMATIC

FORWARD

AIR-COOLED 8.7-HP. NSU WANKEL ENGINE

PROPELLER GEARBOX

OIL RESERVOIR

SHIFT-CONTROL VALVE

NEUTRAL

PUMP

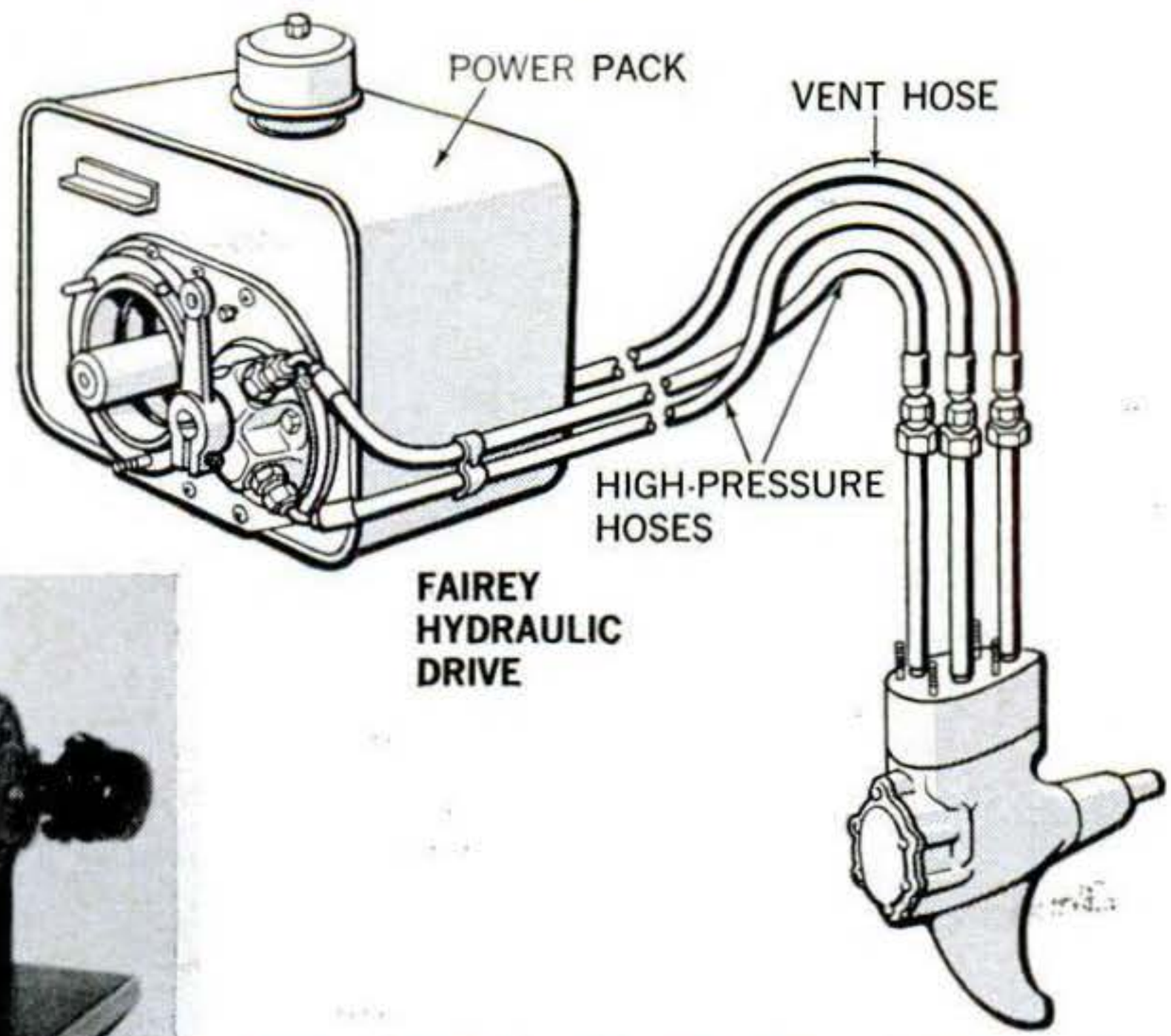
2:1 REDUCTION GEAR

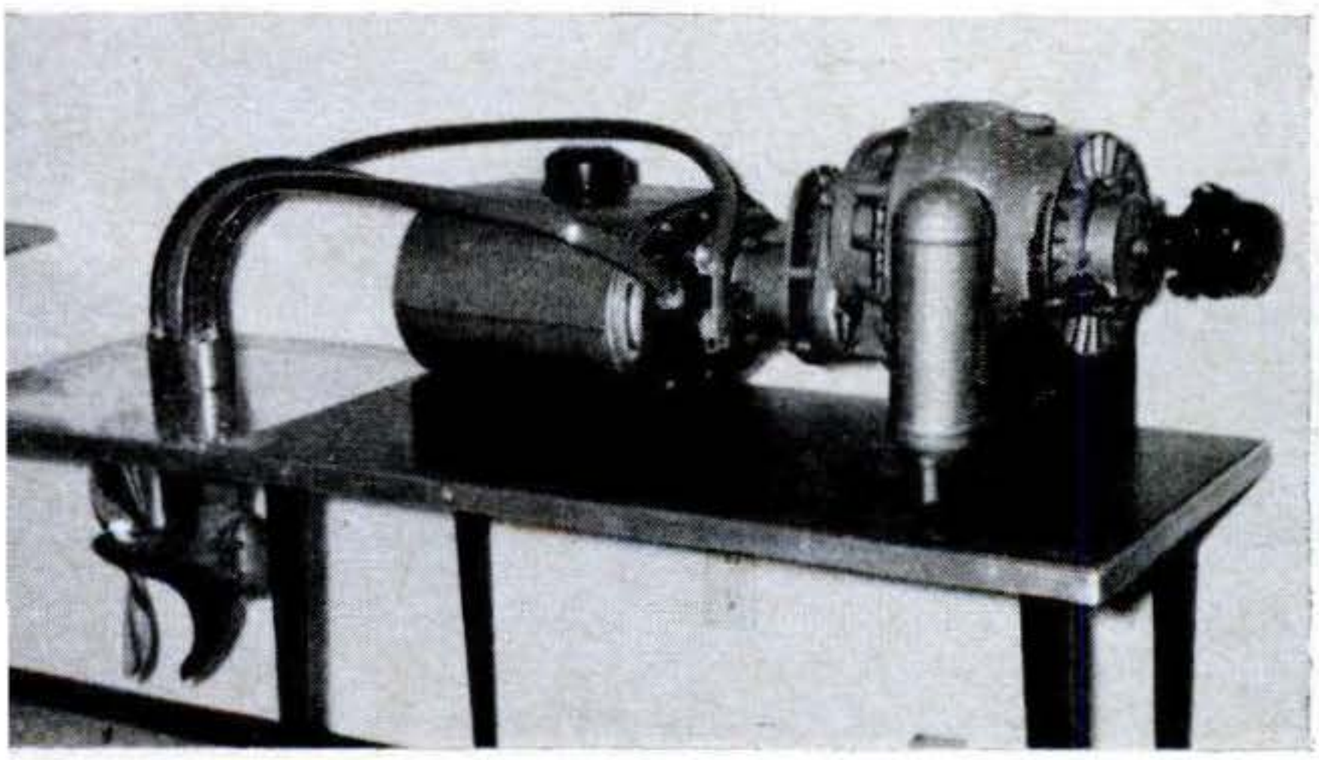
REVERSE

OVERLOAD-RELIEF VALVE: OPENS IN RESPONSE TO COLLISION SHOCK LOADS OR FOULED PROPELLER

EMERGENCY

Oil pumped through hoses turns the propeller. With no shaft requiring alignment, the engine and hydraulic power pack can be located anywhere in the boat, even aft of the propeller or under a side seat. This positioning flexibility solves the auxiliary-engine problem on sailboats, many of which haven't readily lent themselves to conventional inboard propulsion machinery.



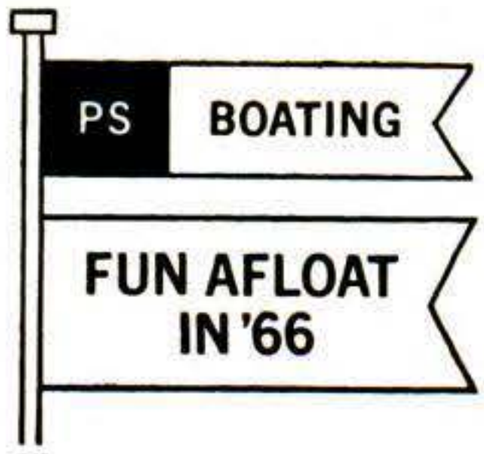


Dry weight of the complete 8.7-horse NSU Wankel and the Fairey hydraulic-drive propulsion package, seen at the left, is 84 pounds. The engine alone weighs only 42 pounds. Rotomotive Industries sells the package for $995.

Copyrighted material

DRY-SLIP MARINAS: Kinder to Your Boat

Tiered, inside parking for pleasure boats is solving the dockage problem in crowded ports. It spares wear and tear on boats, takes work and worry off owners



By JIM MARTENHOFF

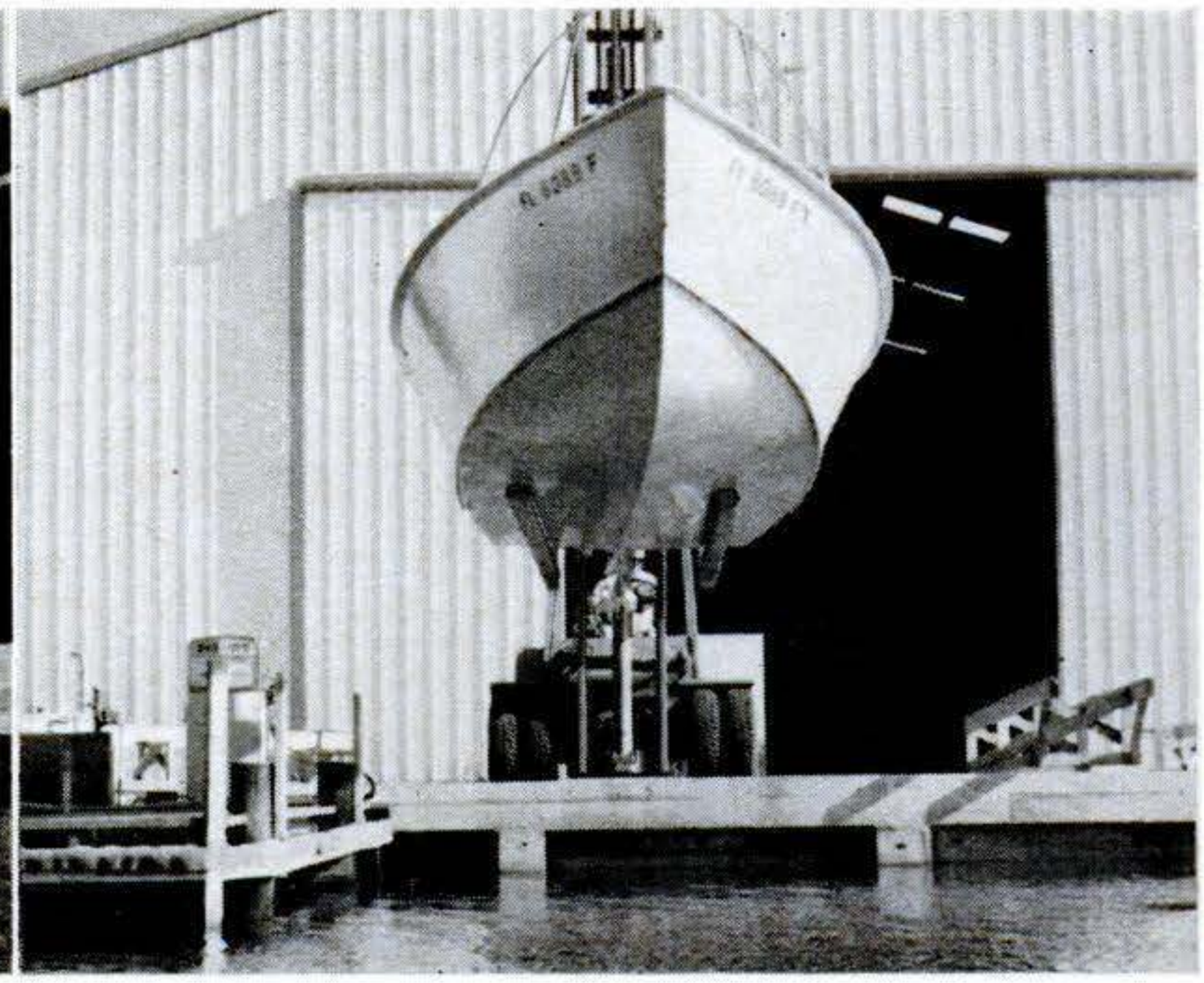
New "dry-slip" marinas stack boats on racks, launch and stow them with specially designed forklift trucks. Hoisting a 23-footer out of the water and sliding her into her assigned dry slip takes only five or 10 minutes. She's afloat again shortly after you telephone your request to put her in the water. When you drive up, the boat is ready to go, complete with topped-off fuel tanks and bait in the bait box, if ordered. Between sessions afloat, dry-marina boats are stored out of the sun, rain, and wind. They don't strain against lines, rub against pilings, play host to seagulls, or collect debris blown from shore. Sheltered from the sun, their finish lasts longer, doesn't yellow or fade. Antifouling bottom paint is unnecessary.

Beginning to boom in popularity, the new marinas are spreading across the land. Florida has 32. They've weathered hurricanes without a tenant casualty, making worry-free storage part of the bargain.

Rates vary, but $1 per foot of boat per month seems to be the minimum. Much of that is offset by greater convenience, better protection, easier maintenance, and higher resale and trade-in values stemming from less wear and tear.

Dry-marina personnel take over when you hit port. They put your boat

1 Basing at a dry marina is like frequenting a good restaurant. You drive right to the door, hop out, and turn your boat over to an attendant.



2 Boats are taken out of the water, often before owners have their cars headed home. When the lift is busy, you just leave your boat tied nearby.

Copyrighted material

Racks and forklifts replace slips and dock lines at the new breed of marina popping up in all parts of the country.

to bed, and launch her again in response to a phone call

3 Sponge bath and hose-down are generally covered in dry-marina rates. Such attention and inside storage keep a boat good-looking longer.

4 In or out in minutes: Phone before you leave home, and you'll find your boat sitting in the water and ready to go again when you arrive.

Copyrighted material

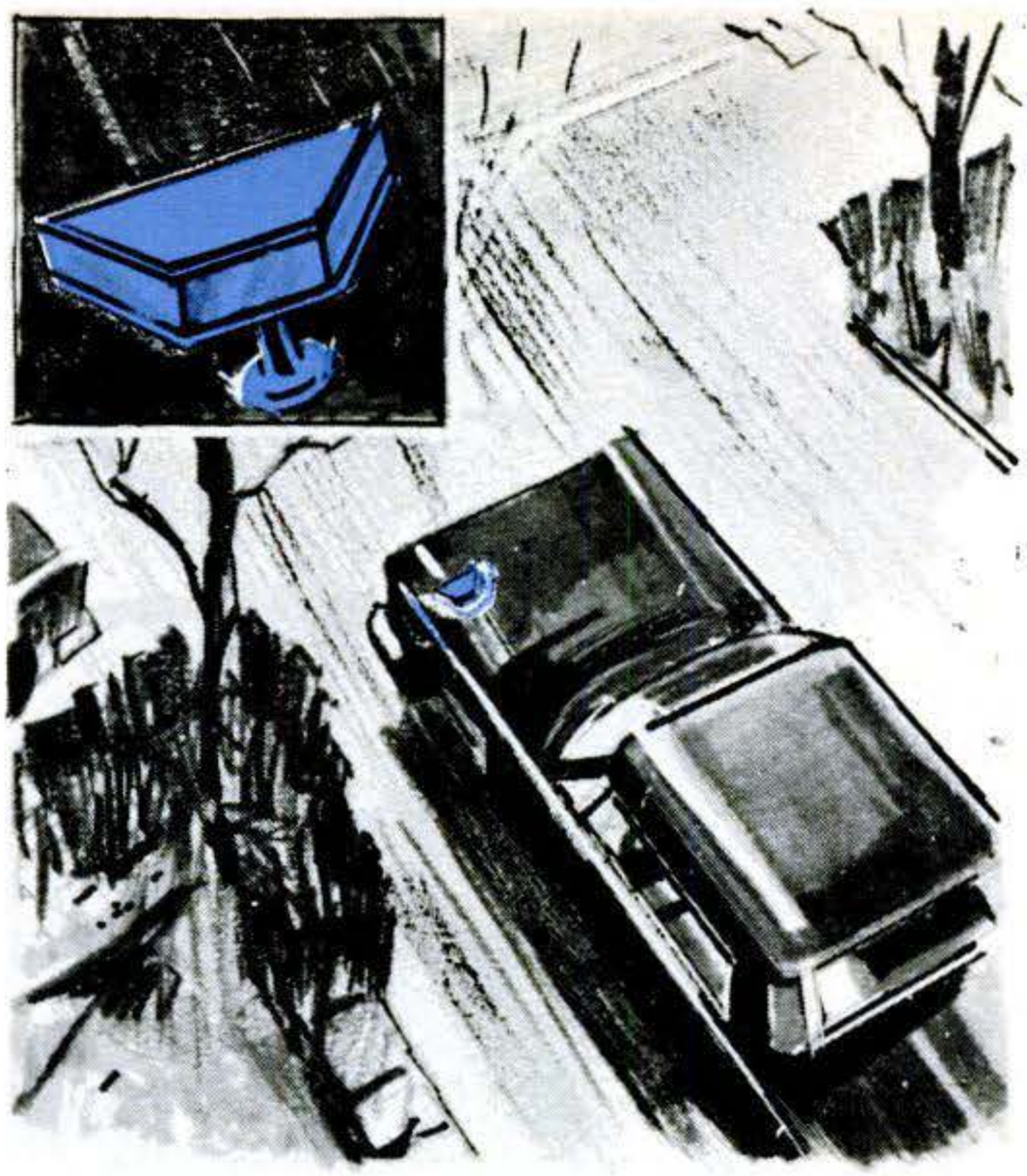
New Ideas from the Inventors

Pump-up sign warns traffic. Police could mark or block a danger area more quickly if they carried these recently patented barricades in patrol cars. Inflated by a gas cartridge in the base, the marker would extend higher than most road signs for better visibility and would be made more prominent by reflective arms and battery-powered lights at night.

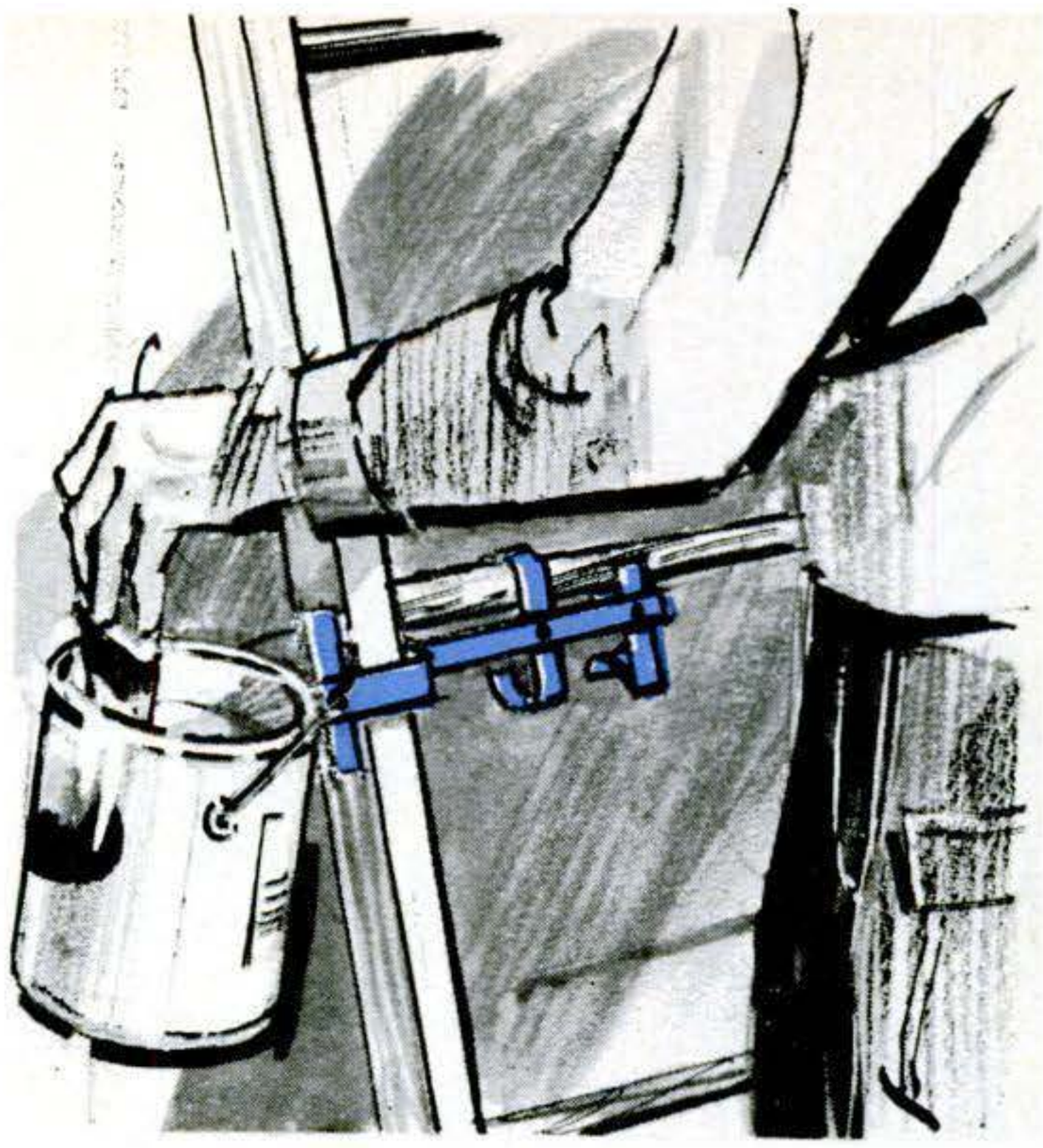
Drill attachment sharpens skates. You could keep your family's ice skates in racing order all season long if you had a portable electric hand-drill attachment like this for hollow-grinding the blades. The slotted device would track the blade to guide the angled grinding wheel. A safety glass would protect you from flying sparks yet let you watch and control the grinder's progress precisely along the blade.

Fingerprint unlocks door. You wouldn't have to fumble for a key to open a door that had this fingerprint scanner. It would examine the pattern of a print pressed against the lock plate, open up if the print was recorded in its memory file. It would help when your arms were loaded with packages from the supermarket, and even the children in a family could come and go without worry about lost or forgotten keys.

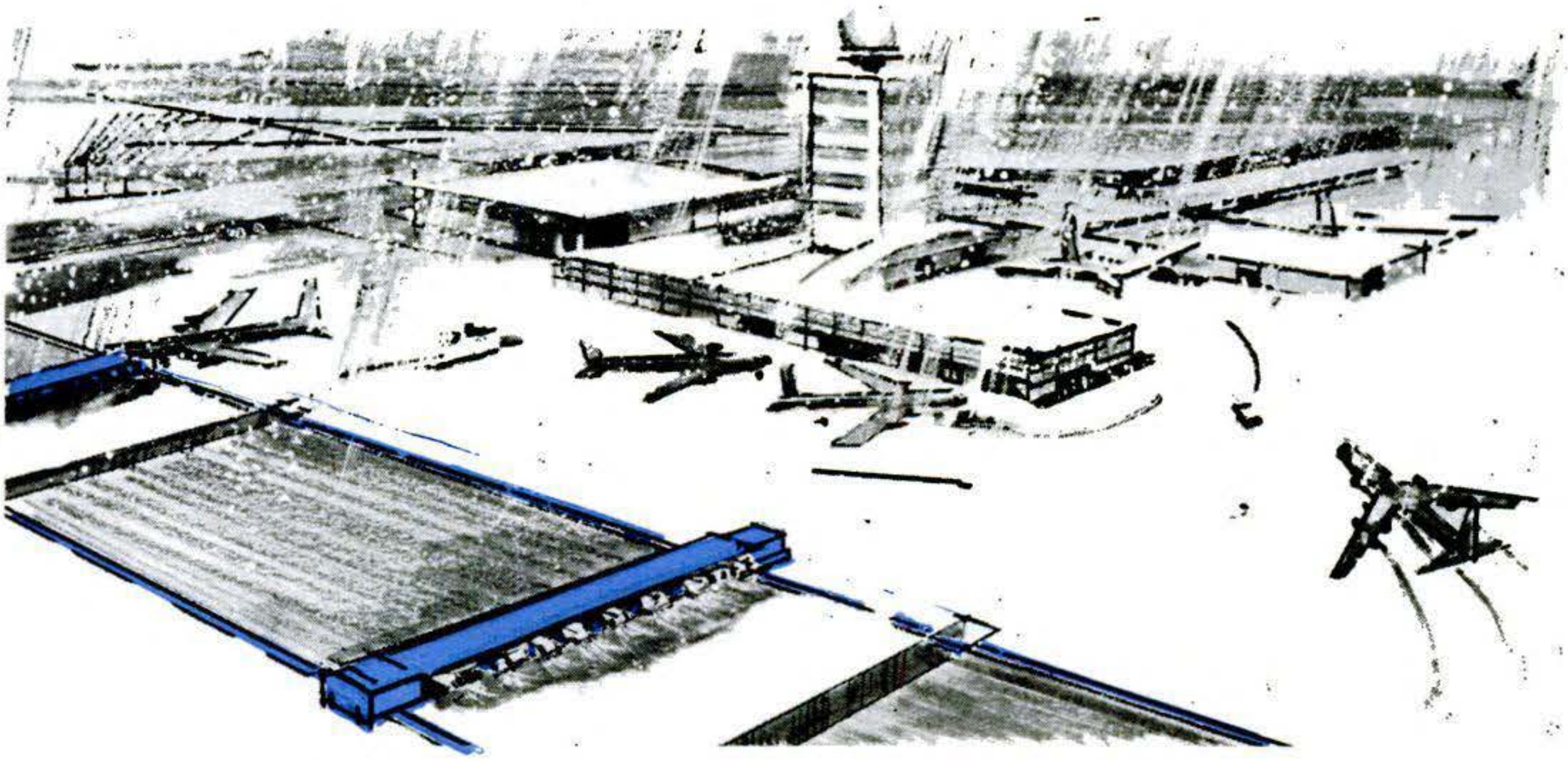
Copyrighted material



Mirror scans side roads. Mounted near the front of a car, this three-way mirror would let you look both ways before pulling out of a blind street or driveway. The two side-aimed, converging mirrors would make lights and images visible before you would normally see them: the third, middle, segment would function as a conventional rear-view mirror.



Ladder clamp holds paint pail. Three hooks attached to a bent horizontal arm would hold a paint bucket within easy reach on either side of a ladder. Turned left or right, the two inner hooks would grip a rung above and below; the outer one would hold the bail of a paint can; and the bent section would steady the holder against the ladder's side rail.

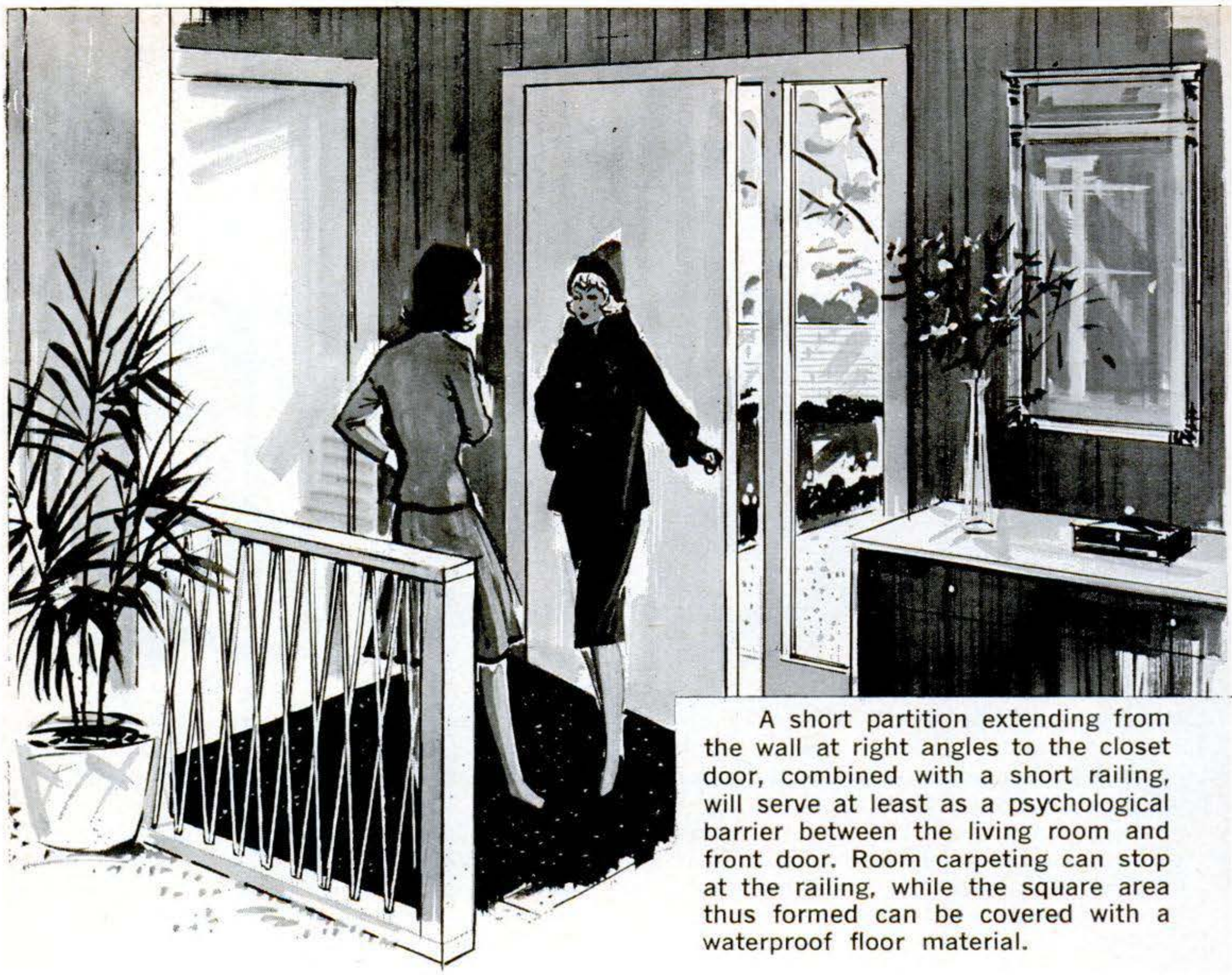


Tracked heater de-ices runways. Riding up and down an airport runway on parallel tracks on each side, these combination heater-blowers would clear off snow and keep ice from forming. To clear the way for a plane, the heaters would drop into recesses. They would be operated from the control tower, could be raised or lowered quickly as traffic required.

The following patents have been issued on these inventions: **Barricade**—*No. 3,197,628 to R. Schuff, Phoenix, Ariz.;* **Skate grinder**—*No. 3,164,932 to G. Morith, Batavia, N.Y.;* **Fingerprint lock**—*No. 3,201,961 to H. Williams, Buffalo, and D. Hindman, Kenmore, N.Y.;* **Mirror**—*No. 3,187,628 to J. Canns, A. Bryant, and C. Lichau, NYC;* **Pail holder**—*No. 3,154,282 to E. Monson, St. Paul, Minn.;* **Runway de-icer**—*No. 3,196,863 to J. Fayed, Hyattsville, Md.*

Copies of patents may be ordered, by number, from the Commissioner of Patents, Washington, D.C. 20231, at 50 cents each. To write to an inventor, if the address above is insufficient, address him (by name and patent number) in care of the Commissioner of Patents.

Copyrighted material



A short partition extending from the wall at right angles to the closet door, combined with a short railing, will serve at least as a psychological barrier between the living room and front door. Room carpeting can stop at the railing, while the square area thus formed can be covered with a waterproof floor material.

How to Live Happily

You can gain all the benefits of a hall by putting up a shield at the front door

By CARL T. SIGMAN

EXCLUSIVE DRAWINGS BY SIGMAN-WARD INC.

Housing experts agree that at least half of the houses built since World War II have no entrance halls. You walk directly into the living room. "When we begin to cut down on costs to meet competition," one builder told me, "the entrance hall goes first."

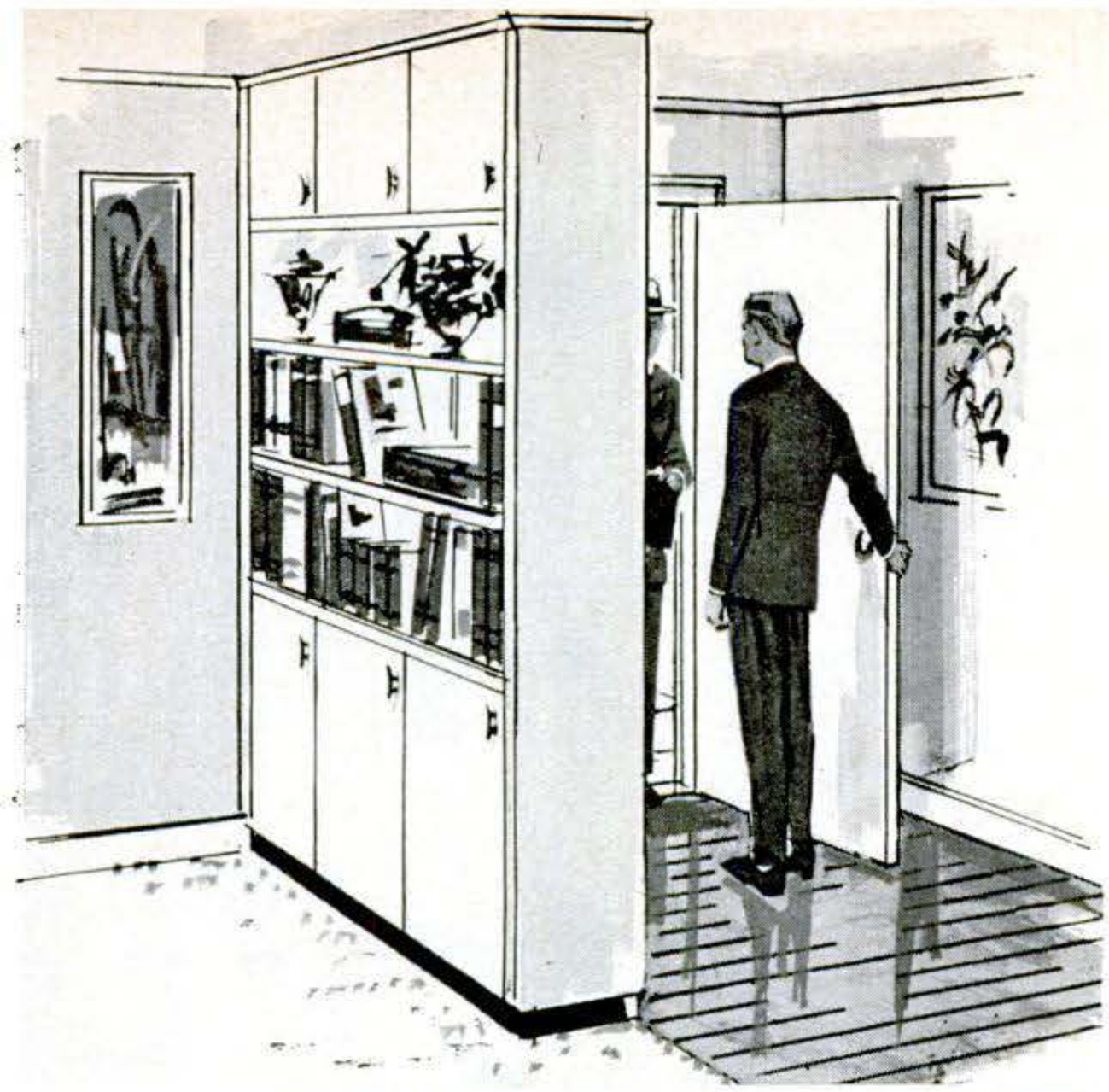
This creates problems for the people who live in the house. The daily traffic pattern, as architects call it, goes directly through the living room. One recent survey found that passage to and fro between various parts of the house—kitchen, dining room, and bedrooms—may make as much as half of the living room useless for anything except as a walkway.

Moreover, you lack the privacy that an entrance hall gives. From the front door, visitors can see much of the house. And in bad weather, icy winds can bring discomfort to anyone near the opening door.

You can solve the problem. Many people already have. Some of the ways they have done it are shown in the accompanying sketches. A form of room divider or privacy screen is the usual solution.

When the idea is first suggested, some home owners object that the front-door barrier will take away living-room space. Actually, it doesn't. The corner is only a walkway, anyway. In a sense, the barrier gives you back space, for you can make a more

Copyrighted material



Privacy barrier at right angles to the front door will reduce drafts, and supply the living room with book and cabinet storage space. On the reverse side, a mirror and perhaps a shelf for last-minute makeup can be installed. It would be easy to make this barrier out of ¾" plywood. It should be anchored to both floor and ceiling. The cabinet and bookshelf space could be varied in design depending on the needs of the home owner.

In many cases there may be no need to build a high barrier. Often the living-room furniture arrangement is such that a particular piece of furniture has to come close to the front door. The drawing above shows such a case. A low cabinet acts also as a lamp table beside a chair or sofa. Above it is a curtain with a track fastened to the ceiling. Thus the curtain can be opened for spaciousness, closed for privacy and shelter from drafts.

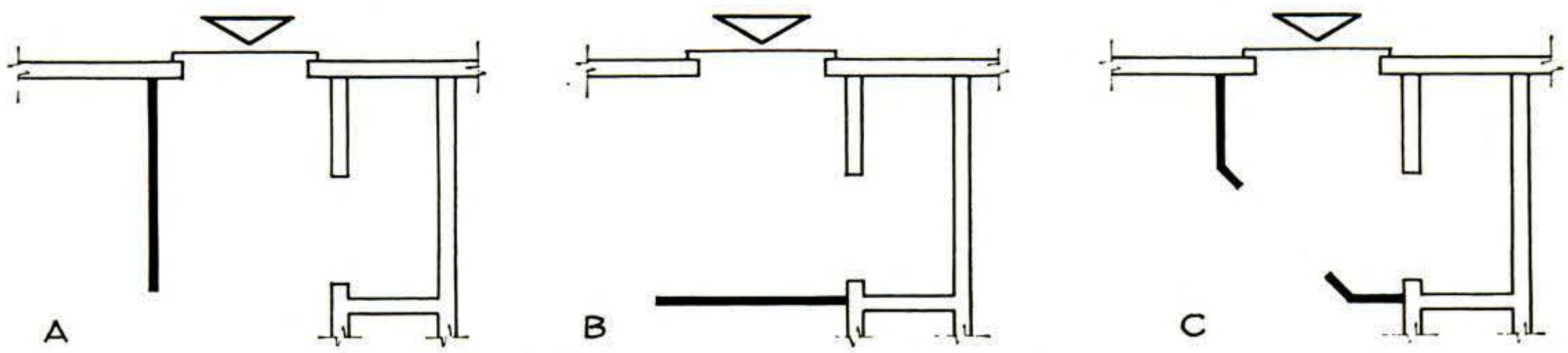
Without an Entrance Hall

efficient arrangement of the room furniture.

A waterproof floor is indicated in some sketches. That's a good idea, for overshoes and dripping raincoats must often be removed there and umbrellas stored.

Some of the suggested partitions are fixed; others are movable. The latter will allow you to open up the area when the need for privacy doesn't exist—and you can have the full-size room.

A screening structure for the front door can go at any of three locations

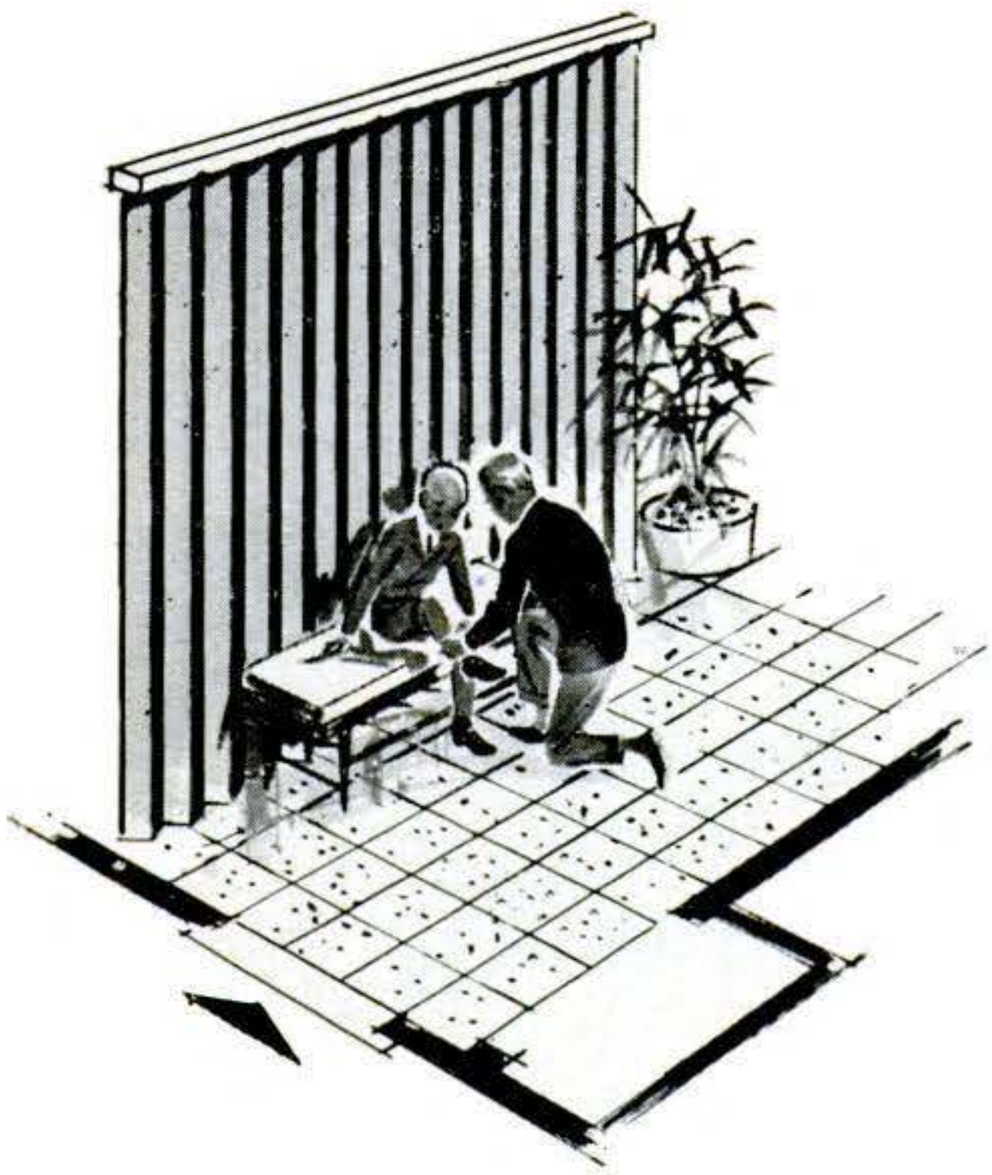


Front doors are usually placed at one corner of the living room in houses built without entrance halls. A clothes closet adjoining the door also is typical. As the heavy black lines show, you can locate a barrier in one of three spots—at right angles to the door (A), directly ahead of the door and parallel to it (B), or across the corner (C). Accompanying sketches show variations of plans.

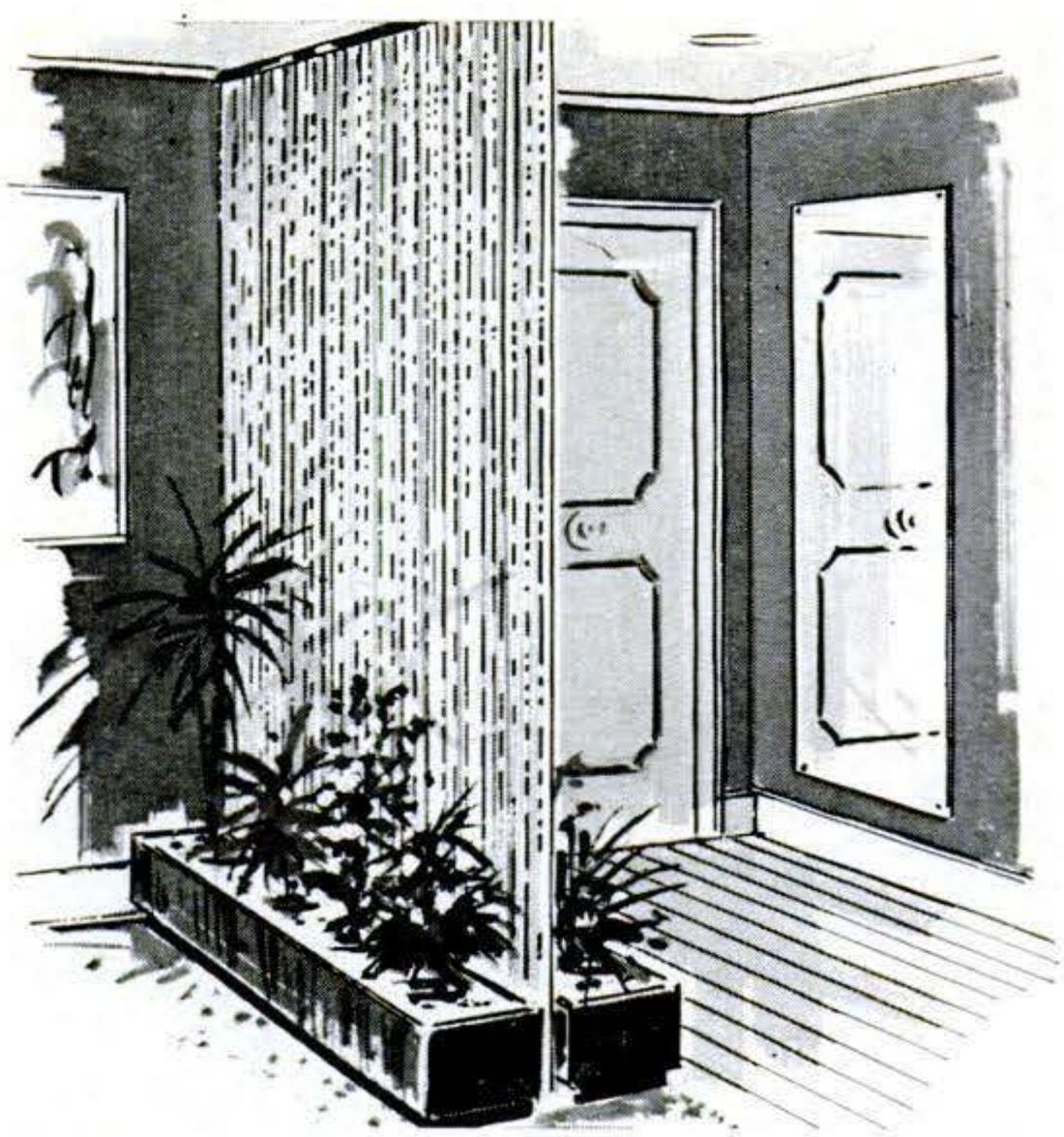
Continued

Copyrighted material

Folding partitions let you open up the entrance area to the rest of the



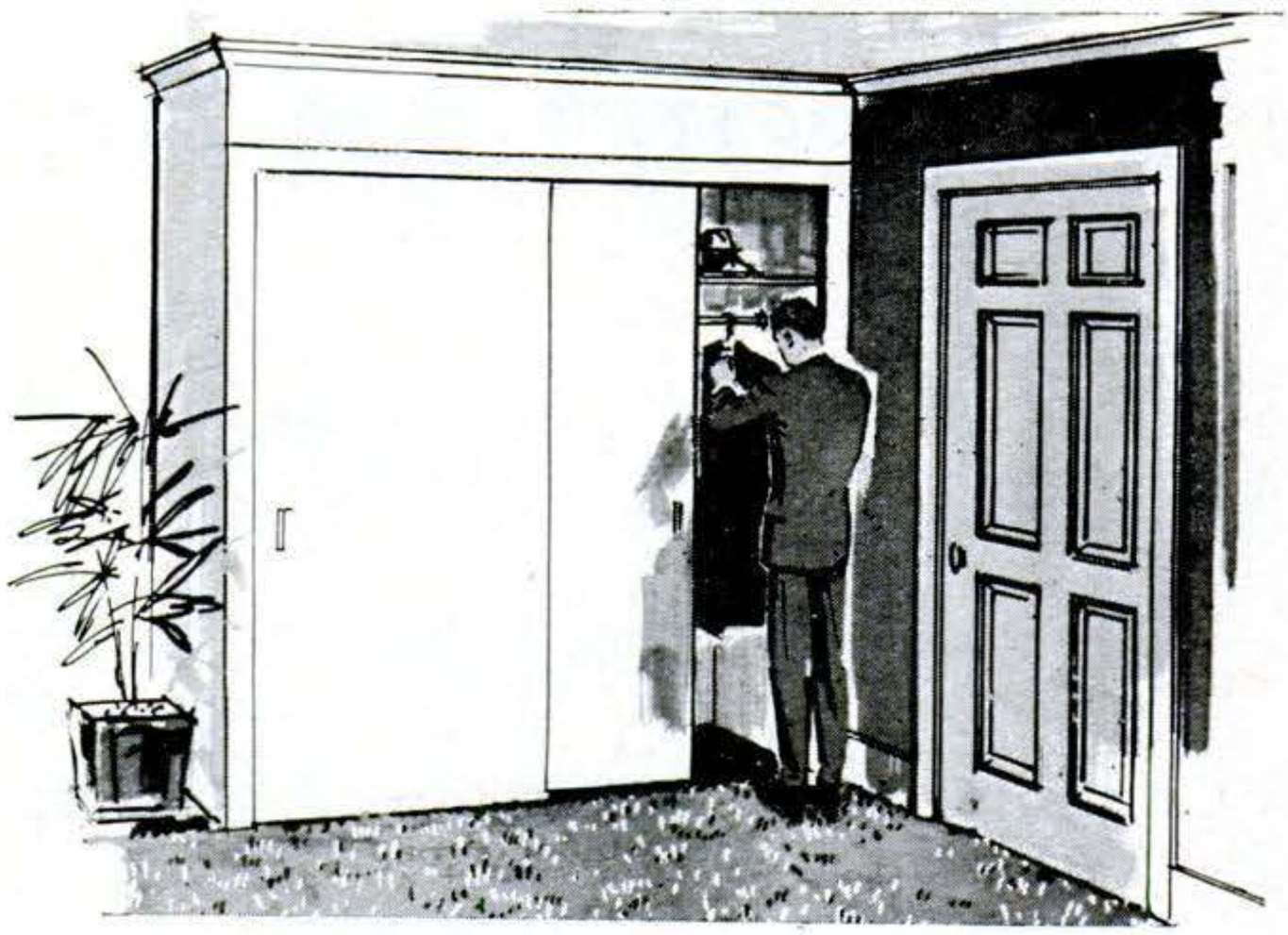
At times you need privacy and shelter from the elements, and at other times, you don't. The folding door shown above can be opened in an instant. It is shown here at right angles to the front door, but it could as well be hung parallel to the door, perhaps to close off a dining-room end of a living room. Attach accordion-fold doors to the ceiling.



Brass-chain drapery hung between two flower boxes is a simple solution. This semi-transparent hanging gives adequate front-door privacy when needed. At other times it can be pulled back to the wall. This is a living-room corner without an adjoining closet. A full-length mirror is suggested for the wall beside the front door for last-minute makeup.

Fixed partitions can give you privacy—and sometimes add to the total

A permanent partition parallel to the front door may very well serve as a powder room. The cabinet can be used for storage of overshoes, gloves, and scarves. A bookcase or an additional storage cabinet can go on the living-room side of the partition. The structure in this case stops at closet-door height, but it can be built to the ceiling for more storage space and additional privacy.

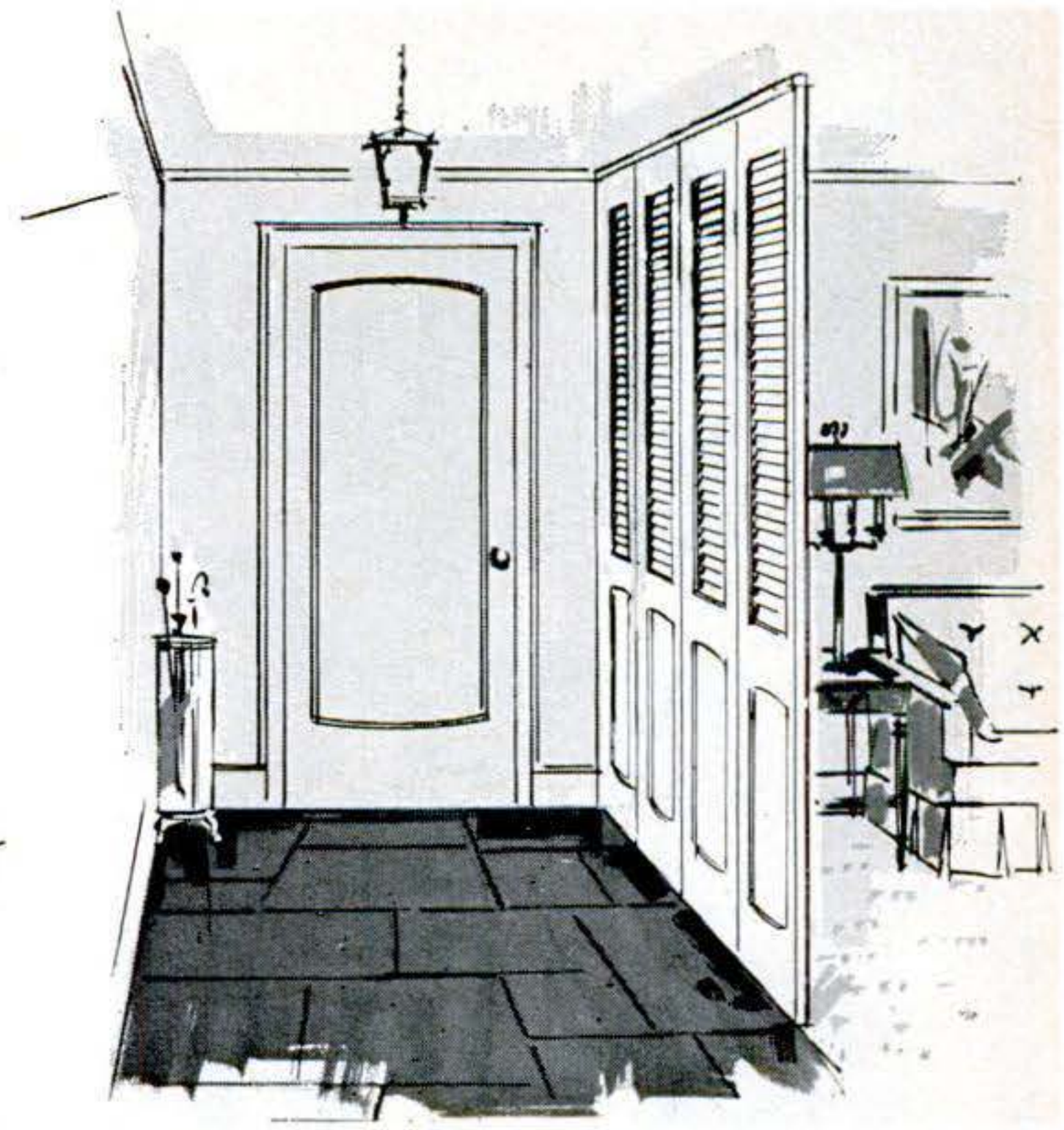


If a coat closet is located at a distance across the living room, as you'll find in some development homes, that closet can be used for other storage and a new one built at the door. The new one will double as a sheltering partition for the living room. Sliding doors are best for such a permanent installation. Closet depth should be at least two feet for hanging up clothing on a closet pole.

Copyrighted material

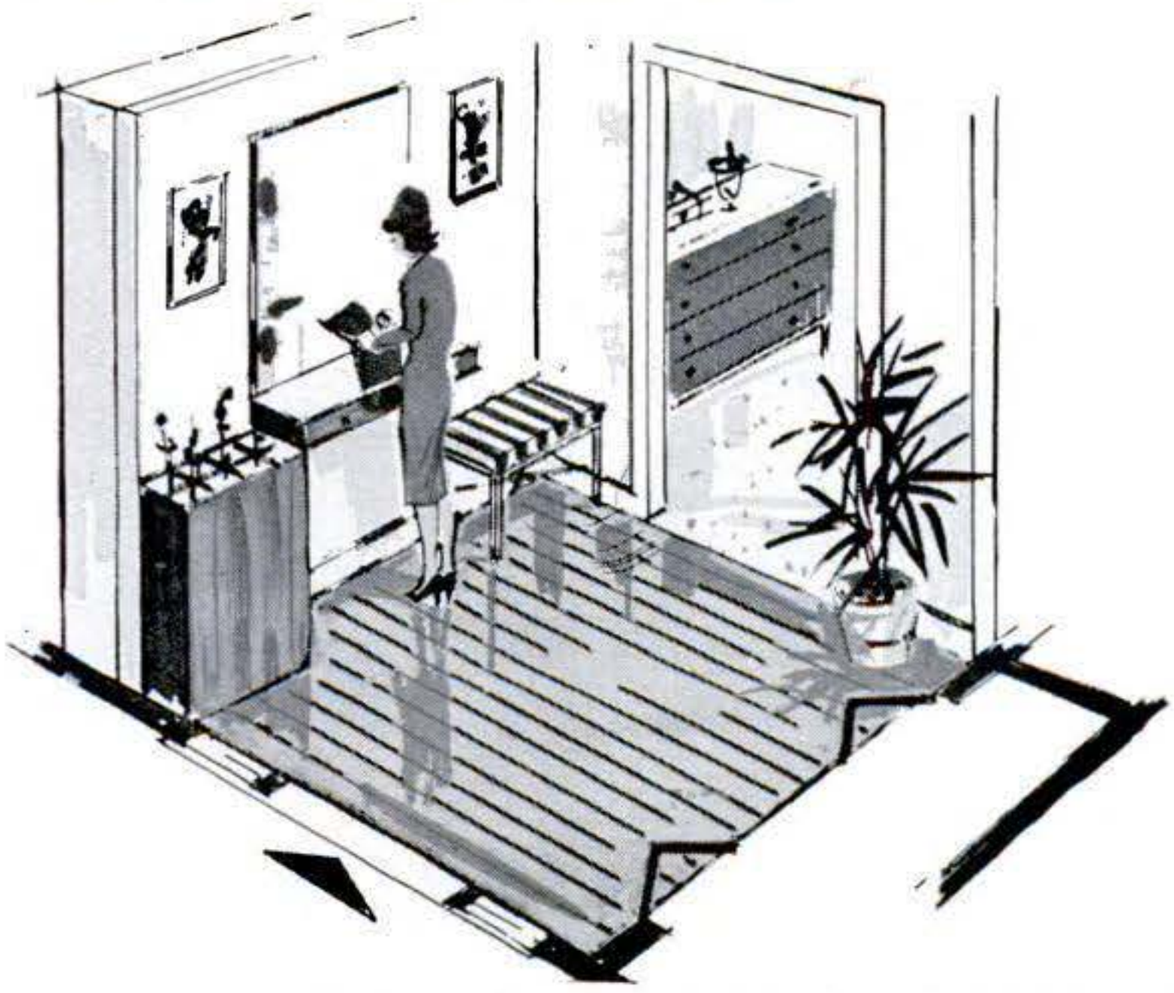
living room when you wish

A diagonal enclosure might look like this. Two short partitions come out at right angles to each wall. These are joined by a folding partition at 45 degrees to both walls. This folding partition can be opened partially or fully, or closed entirely. The partitions can be framed with two-by-threes and covered with plasterboard, an easy do-it-yourself job.

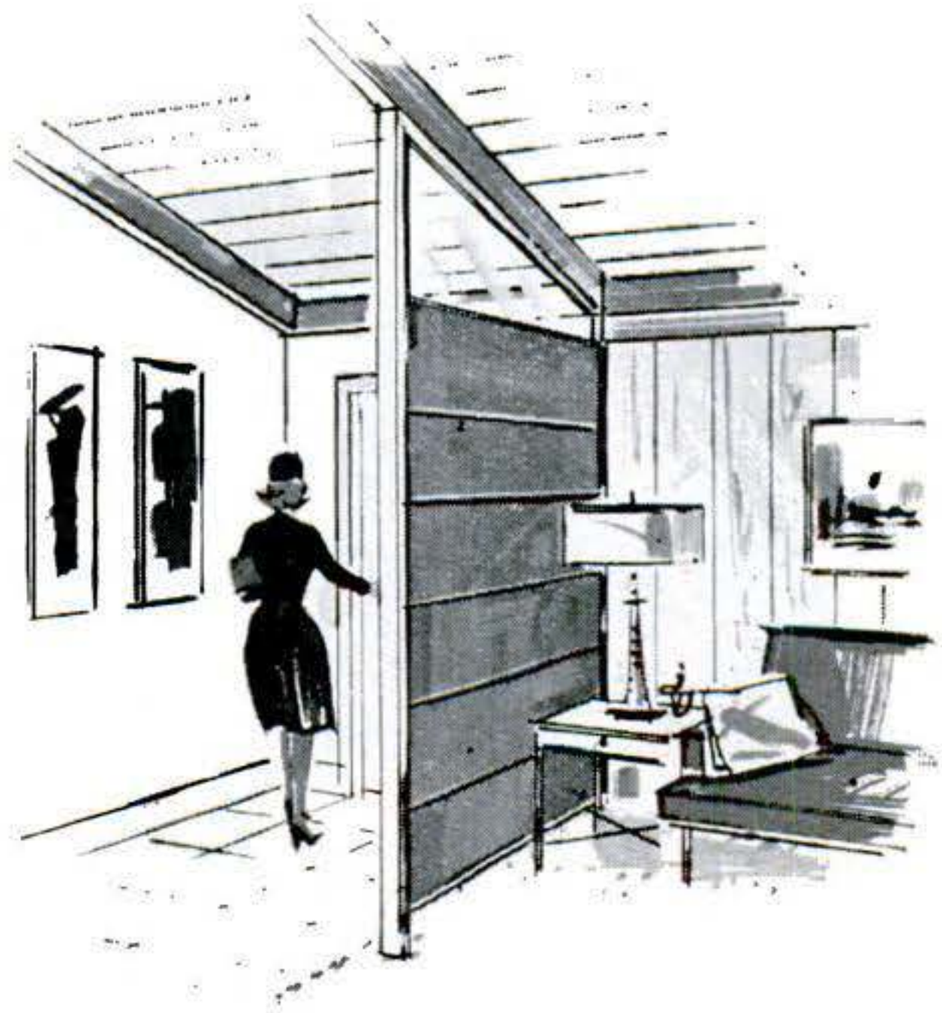


Folding doors are made today in many attractive designs and woods. They can add to the appearance and utility of any living room. Many of these can be bought as a unit in as many panels as required, hinged together, with ceiling track and other hardware included. Since a floor track is not required, the door can fold back over carpeting.

storage space of your home



On the entry side of this permanent storage partition are a mirror, umbrella rack, and a shelf for mail. At right angles is a doorway to the living room, with or without a door. You thus have a weatherproof vestibule, with the front door and coat closet on the other two sides. You can use vinyl, vinyl-asbestos, asphalt, rubber, or other waterproof flooring in this and other enclosed areas.



If you live in a house with a plank-and-beam sloping ceiling, you can anchor a front-door partition to the front wall of the house and to a four-by-four fastened to the floor and to an exposed rafter above. Horizontal pieces of hardboard faced with colored plastic would be attractive as a partition covering. Glass is suggested for the triangular area at the top, but you could simply leave it open. PS

Copyrighted material

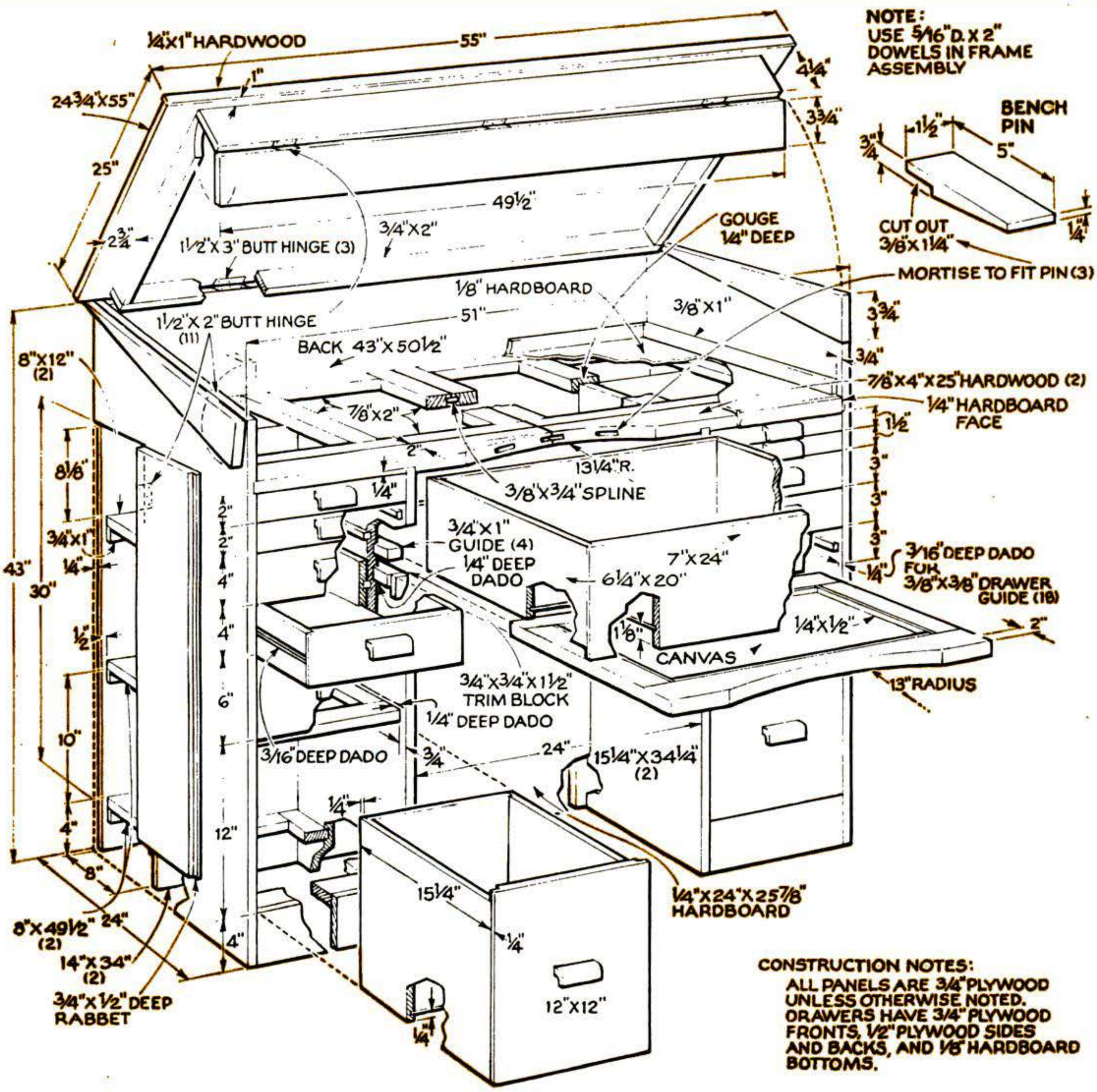
Build Your Own HOME

It's ideal for any hobby, and the high-low stool lets you sit where the work is

By CHARLES E. RHINE

Whatever your hobby is—modelmaking, handicrafts, electronics—this bench is a perfect center for your activities. It's crammed with ideas taken from several types of industrial benches. Every inch of it serves to make your hobby more fun. There's plenty of room for storing tools and supplies, and

Copyrighted material



Building it: First make the drawers and the two drawer compartments. Dado end panels and glue the drawer slides in place. Build the frame for the bench top in two sections and join them with a hardwood spline. Screw the hardboard surface to the bench top so it can be easily replaced when worn. Use a 3/8" mortising bit to make the holes for the bench pins. To make the bench so it can be disassembled for easy moving, use screws to attach the bench top, the back panel, and the kneehole panel. Attach shelf cleats for back compartment before putting back panel on. Most of hobby center is 3/4" plywood.

HOBBY CENTER

lots of working space. And that unusual stool lets you relax. Both pieces were designed by A. M. Warkaske, Editor of Rockwell's magazine, *Flying Chips*.

The bench has two work surfaces—one at stand-up height, one at sitting height. (The high-low stool lets you sit at either one.) The top lid of the bench closes level to make a large work surface. Or flip down the hinged endpieces, and the lid slopes forward to make a drafting board for designing new projects. Open the lid and there's a low-level bench top at chair height.

A large drawer right under the center of the bench top makes a handy trash bin.

Continued

Copyrighted material

Line it with sheet metal to make it easy to clean out. You pull the drawer out and clear the work surface with a quick sweep of a brush. Mount your vise over the drawer, and most waste will drop into it.

Roomy drafting board is made by flipping down the hinged endpieces to let the top slope forward. Keep drawing instruments handy in shallow top drawers.

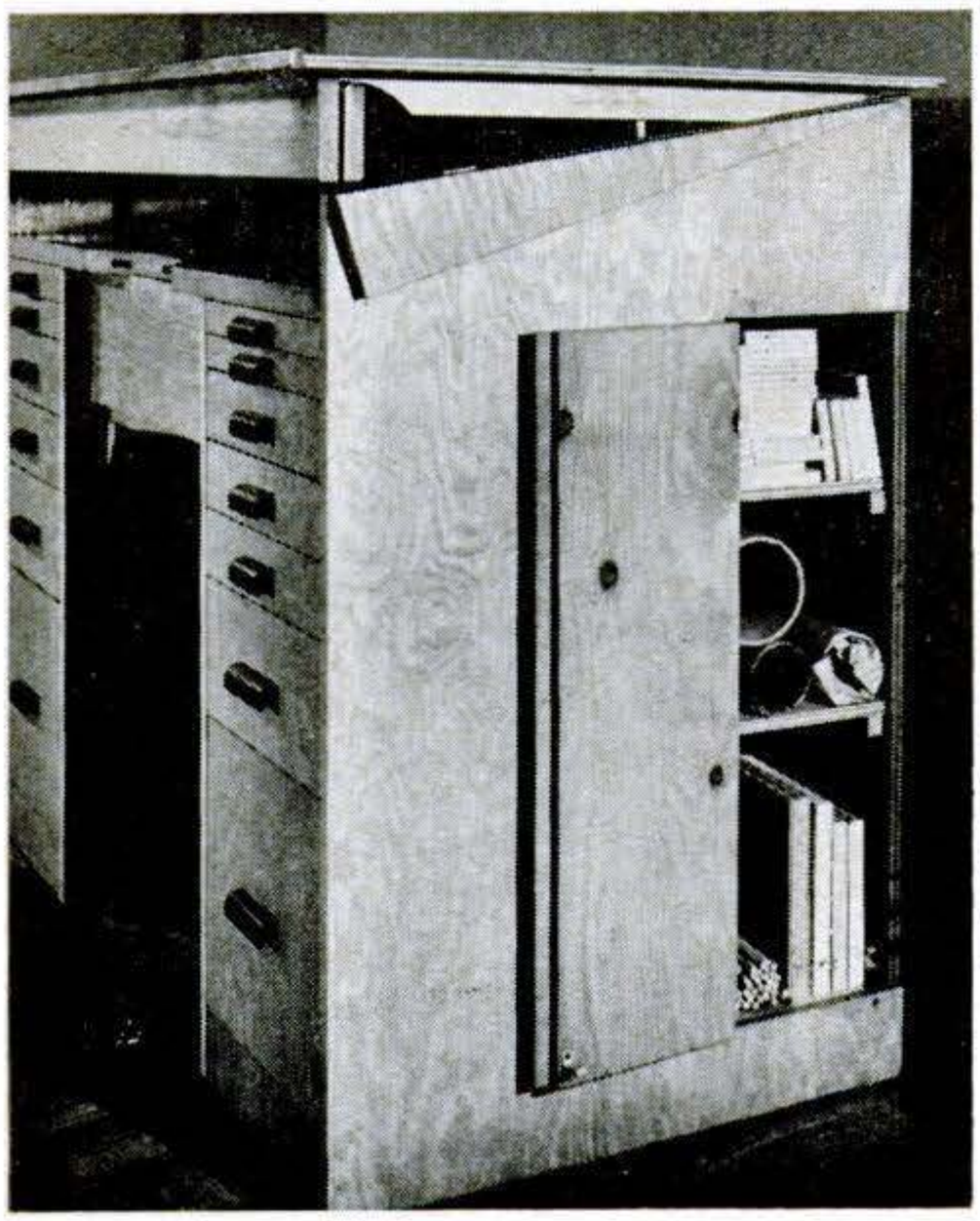
Mortises in the front of the bench top are for bench pins. Plug in a bench pin to get a handy surface for working with small parts. The jeweler's apron slides out below the trash drawer. This is a shallow drawer with a canvas bottom. You pull it out when working with small parts like those used in modelmaking. If a little screw is dropped, it's caught in the apron. You don't have to get down on your hands and knees and search the floor.

The drawers—13 of them—are made in six different sizes to fit practically any need. At the bottom of each tier is a large file drawer for letters and catalogues.

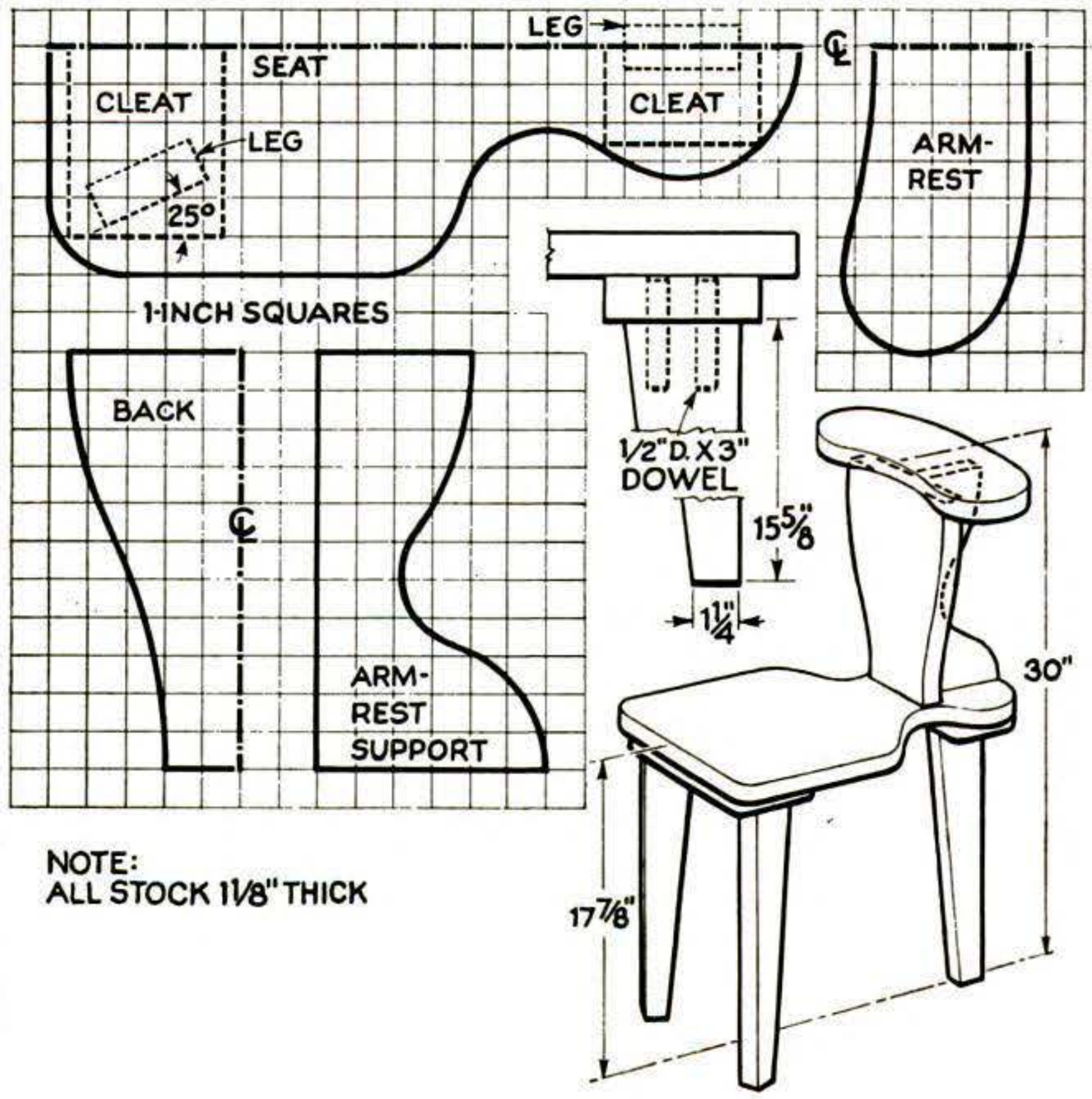
The storage space at the back of the bench can be reached by doors at either end. It holds materials up to 8″ across and 4′ long. Also, when the top lid is in closed position there is an 8″ space above the regular workbench top. This is a fine place for freshly glued, painted, or semiassembled projects to be left safe and out of the dust.

The hobby center is made mostly from ¾″ plywood. Construction details are given in the drawing on the previous page. Assemble it with finish nails and glue. Set the nails and fill holes with putty. Sand all surfaces, blunting corners, and give it two coats of penetrating resin sealer. PS

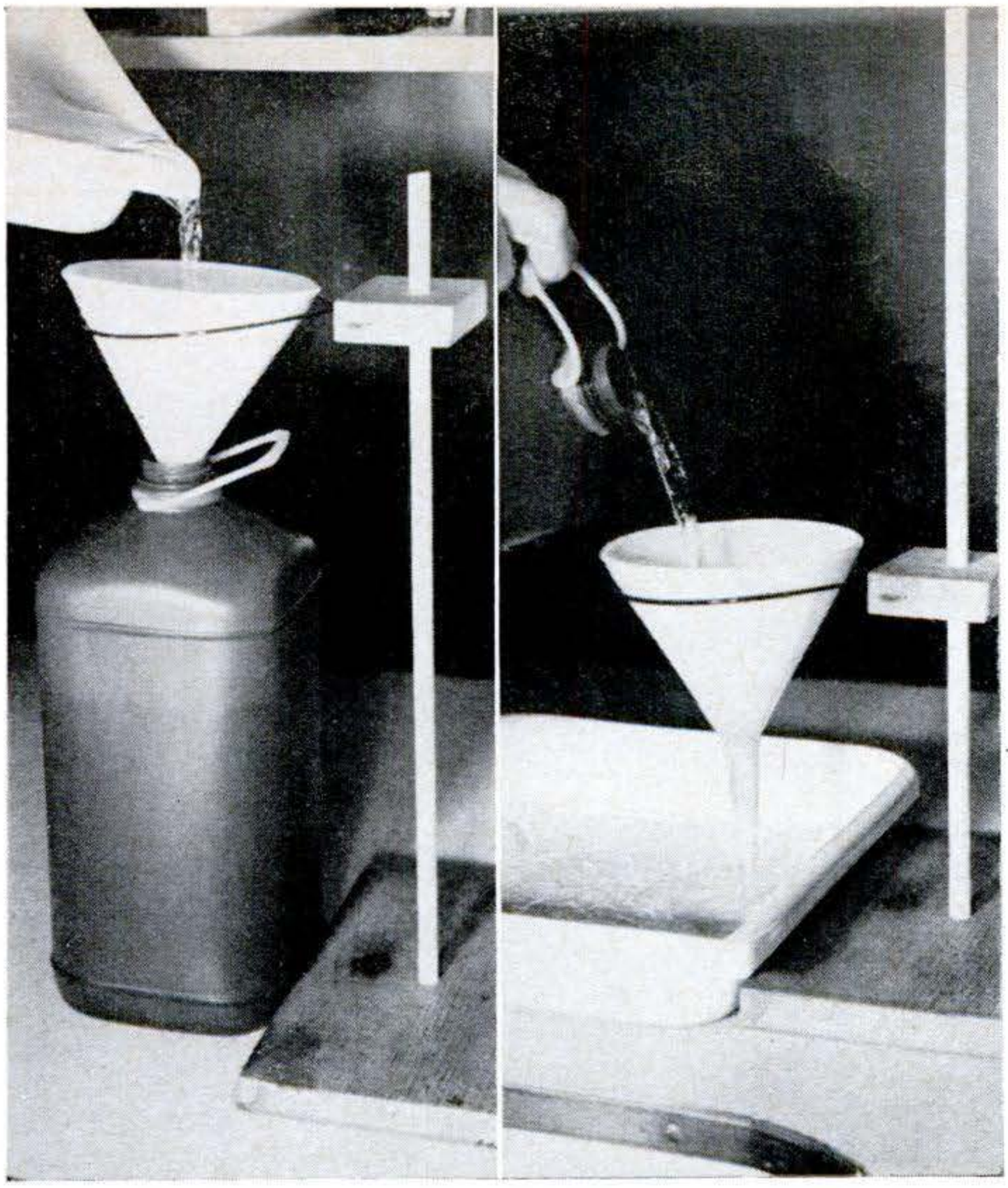
There's plenty of storage space at the back of the bench to put long things such as dowels or lumber. There's storage space between the two tops, too.



High-low stool makes a fine accessory for your hobby center. Or build it by itself to use around the kitchen. It goes together with dowels and glue.



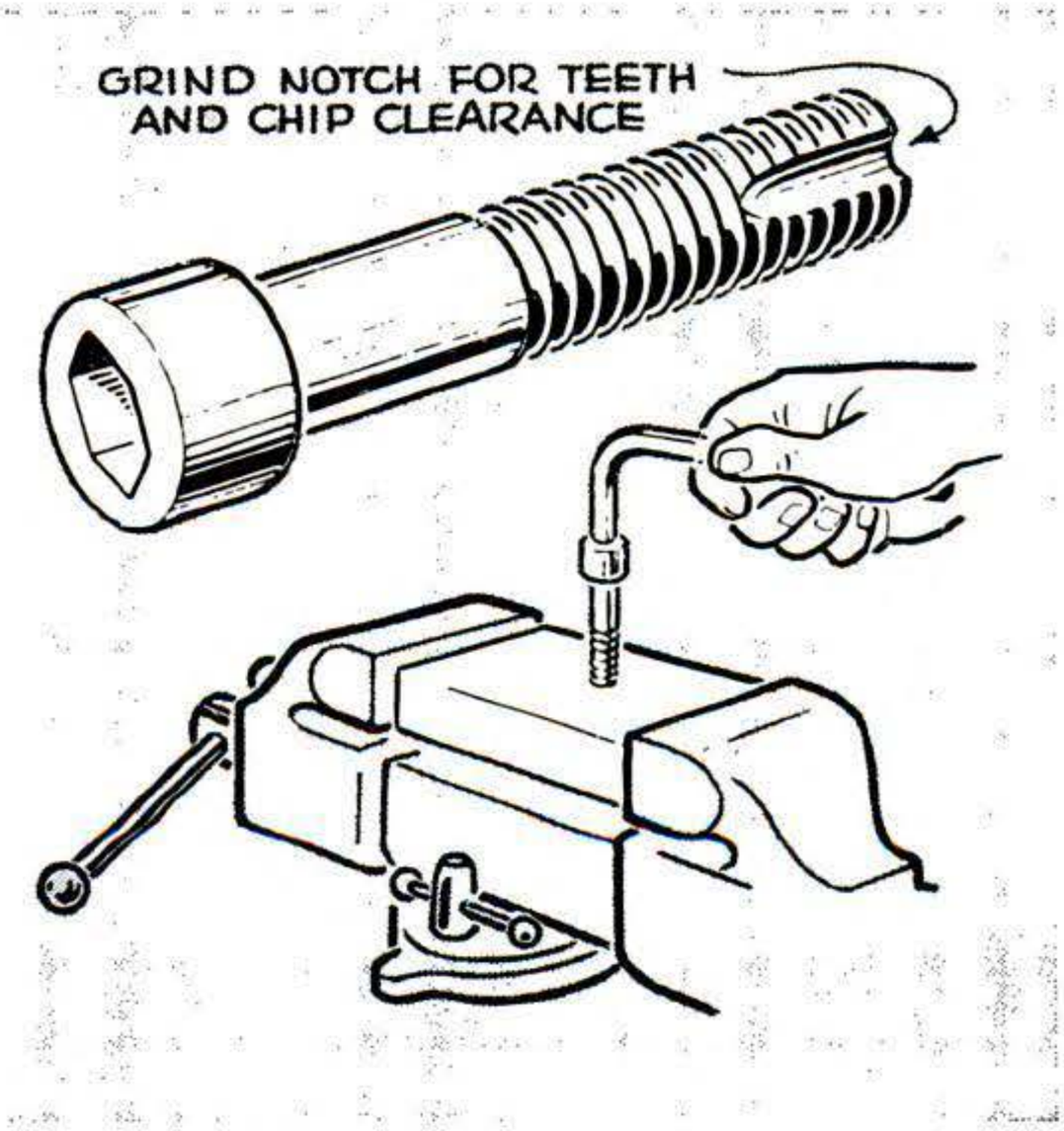
Copyrighted material



Quickly made holder aids darkroom pouring

The adjustable funnel holder at left is like a third hand when you're pouring chemicals. It's merely a couple of squares of ¾" pine, a 17" length of ⅜" dowel, and part of a wire coat hanger. The small holder block slides—but not too freely—up and down the dowel. The ⅜" hole drilled in its center was reamed slightly with a rat-tail file to get the right fit. Holes drilled at angles in one side take the ends of the looped wire. Sizes of the base and sliding block are not critical.

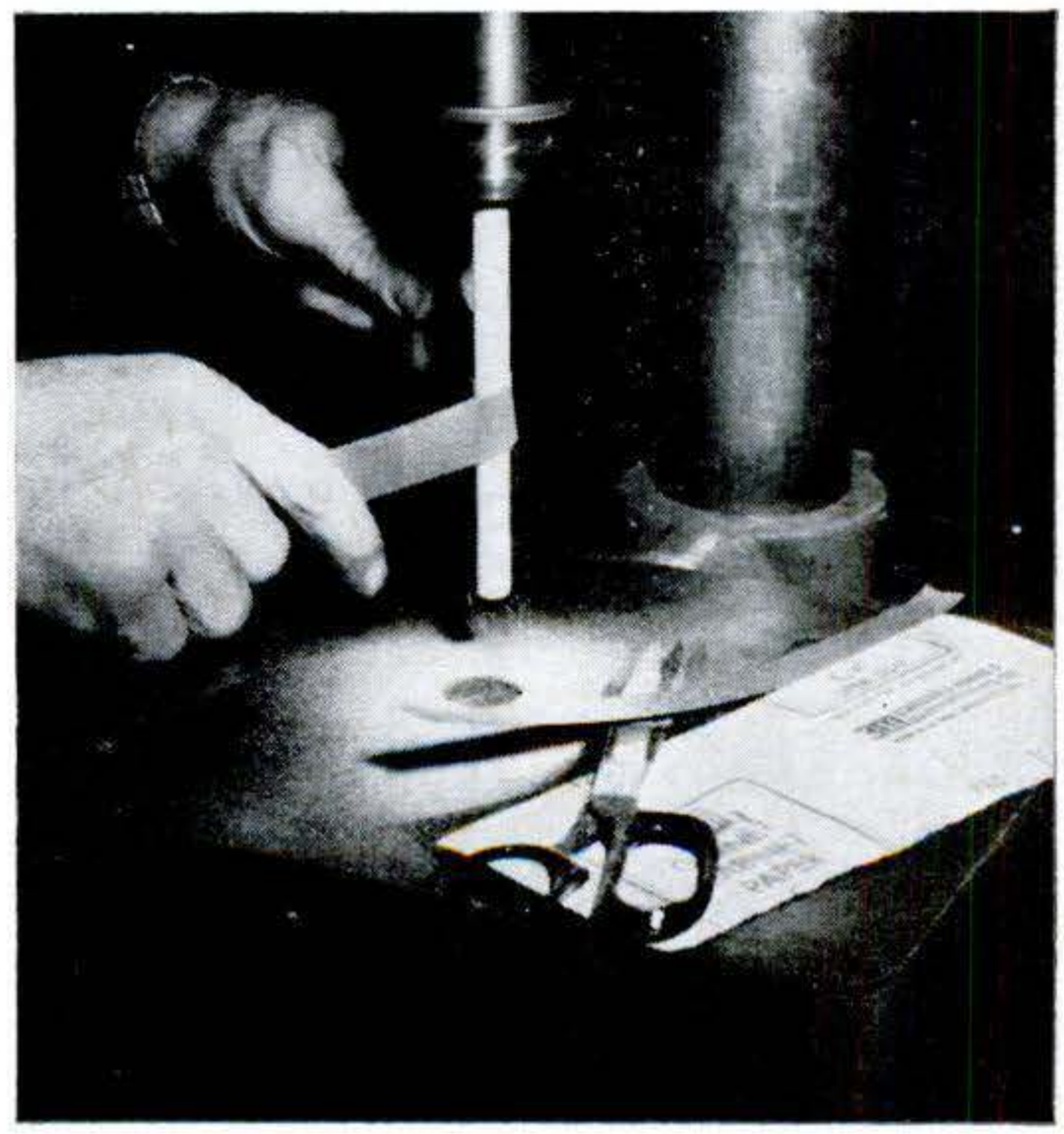
GENE HANDSAKER,
Redondo Beach, Calif.



Allen screw cleans up damaged threads

When tapped holes become burred, scored, or dirt-clogged, I solve the problem with a thread comb improvised from an Allen socket-head cap screw. I grind a notch in the tip of the screw as shown above to get cutting teeth and chip clearance. Since this type of screw is case-hardened, it will cut any soft metal.

ALBERT PIPPI, Baltimore, Md.



Tape reinforces abrasive paper

When a job calls for emery cloth or cloth-backed sanding strips and you have neither kind, make your own equivalent. Apply adhesive tape to the back of a sheet of ordinary abrasive paper and cut out your strips. You'll find them strong and just as effective as factory-reinforced sanding strips.

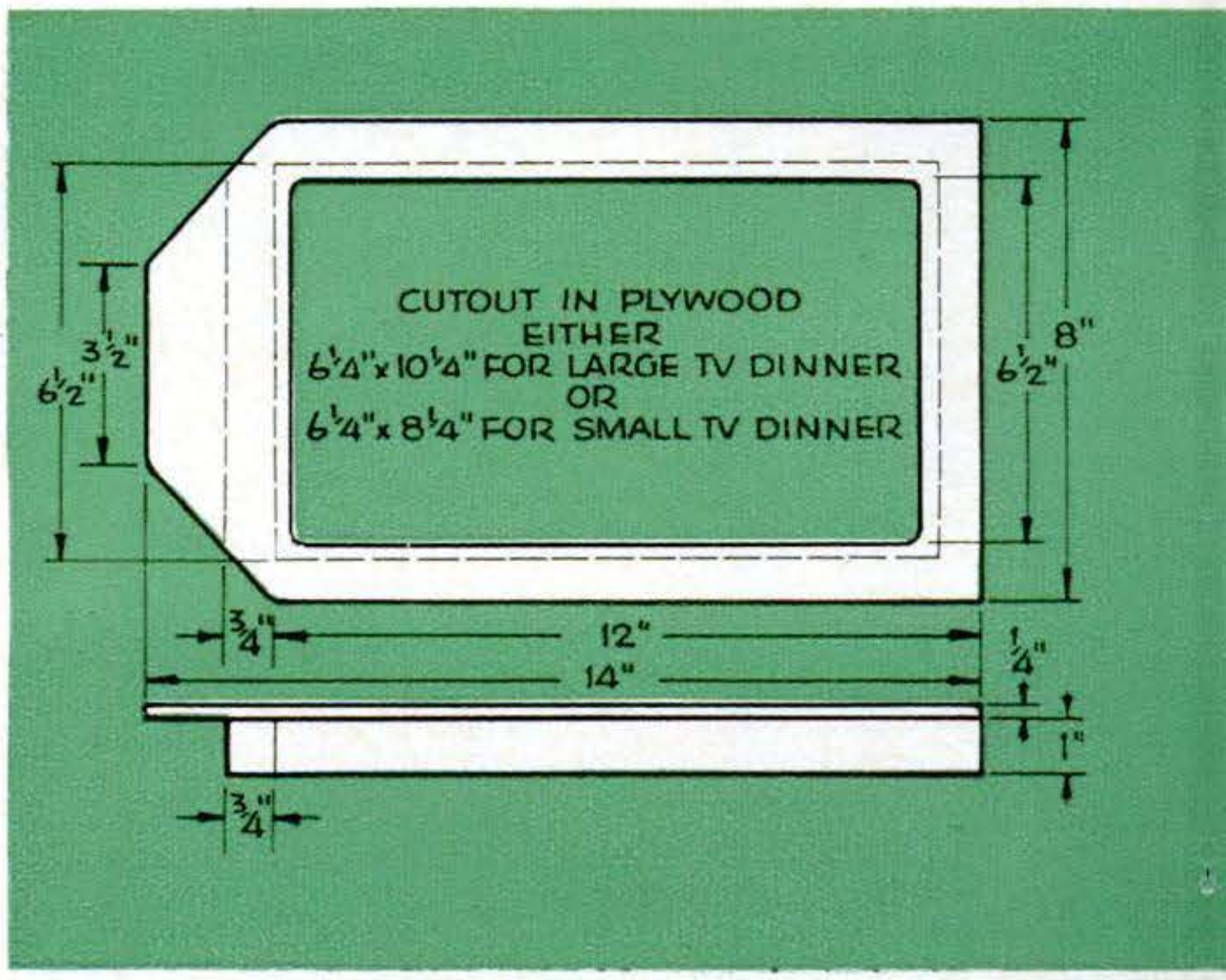
WAYNE JUDY, International Falls, Minn.

Copyrighted material

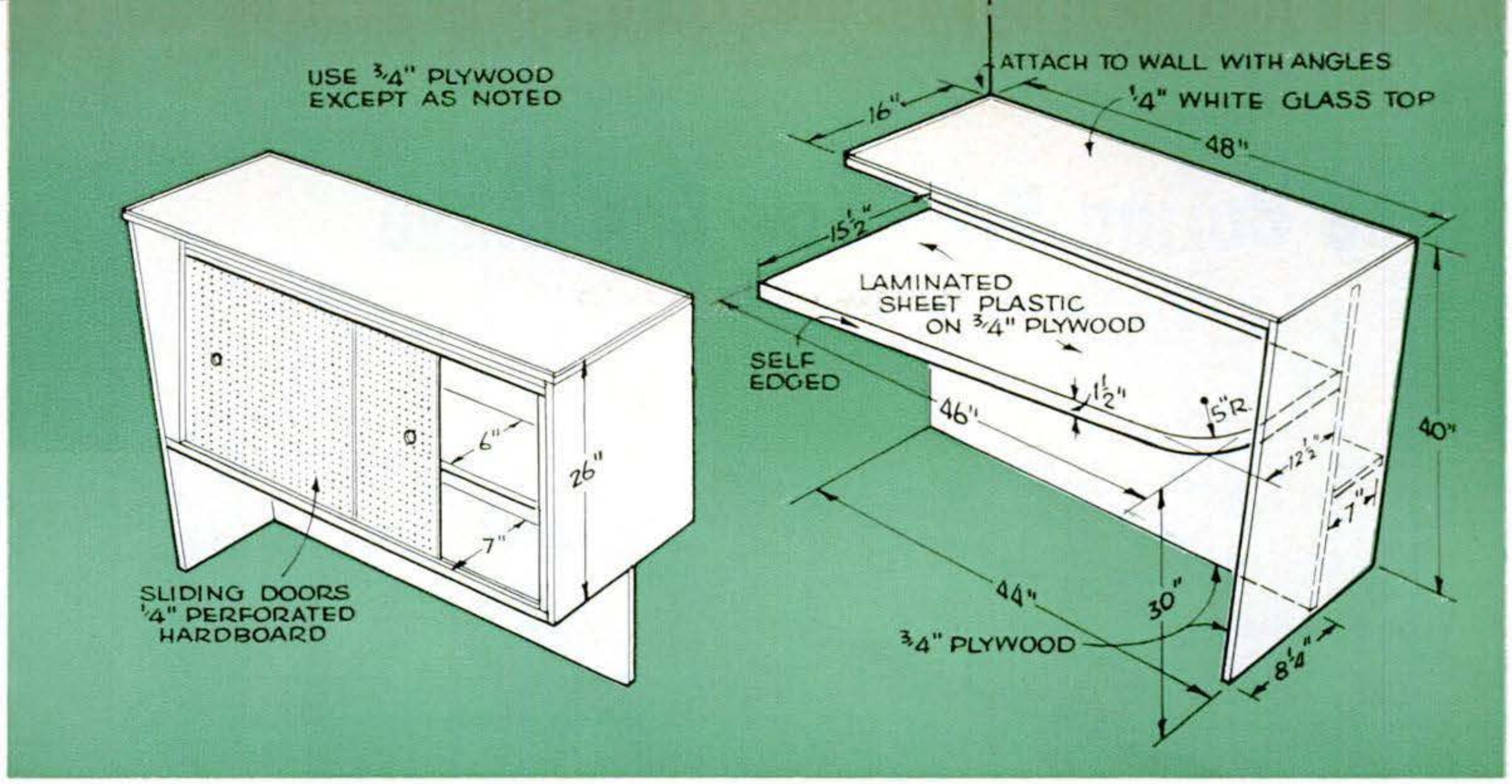
TV Dinner Tray

Secure in a pine and plywood holder, a TV dinner is easy to hold on your lap. Make an underframe of ¾″-by-1″ pine and a top of ¼″ plywood. Cut out the center of the top to accommodate either large or small TV-dinner trays. Before making the cutout, measure the tray your favorite TV dinners come in. Nail ¼″ plywood over the bottom of the frame so the holder sits firmly on your lap. Sand and oil, or shellac, the holder. A similar frame can hold a dish for buffet suppers.

ARTHUR KENNEDY, Neptune, N.J.



Copyrighted material



Snack Bar for the Kitchen

This is a snack bar, a room divider, and a storage cabinet all in one. The dining side has just enough room for two to breakfast or grab a snack. Install a telephone on the wall and it's a convenient planning center. The other side has a handy storage cabinet.

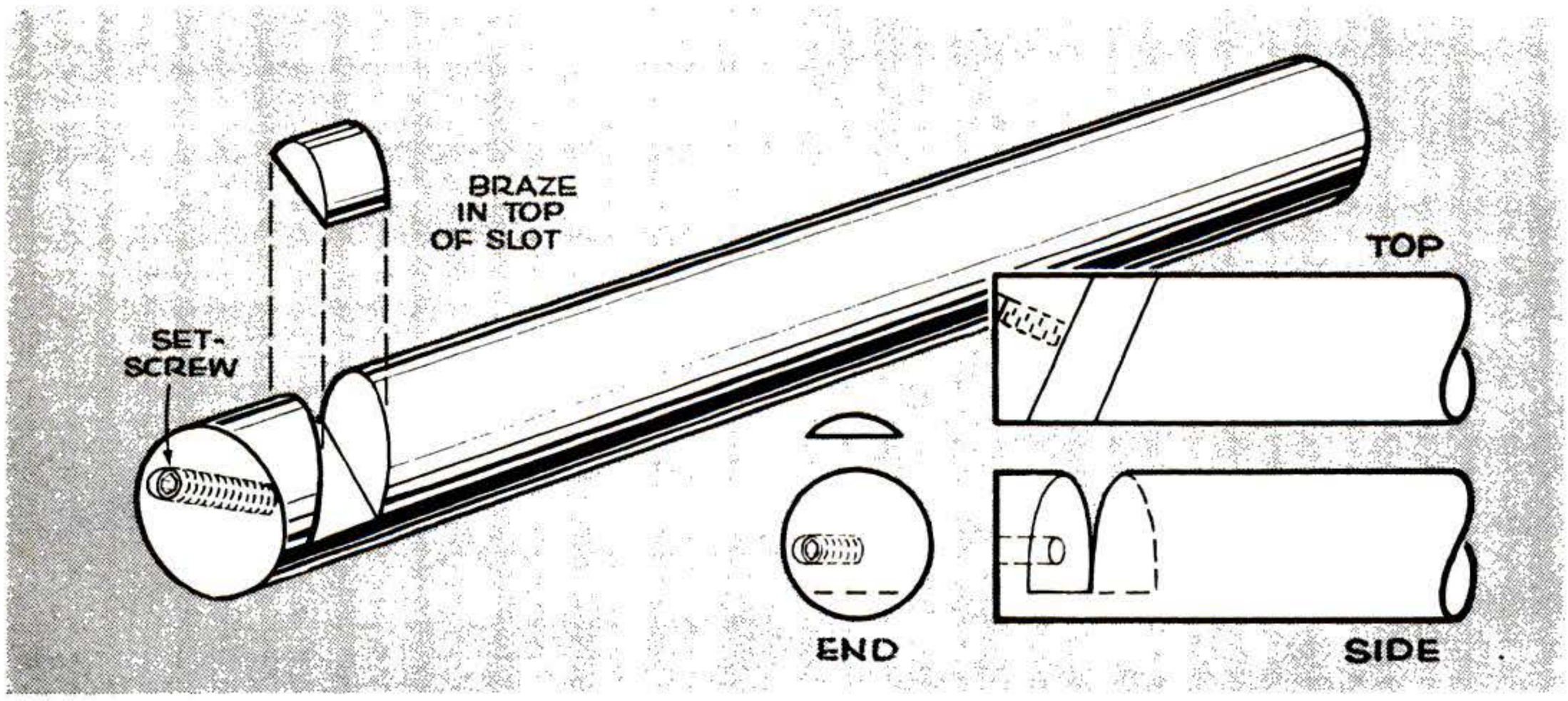
The frame is made entirely of ¾″ plywood. The snack shelf is covered with a white plastic laminate such as Formica, and the top is surfaced with ¼″ white translucent glass. The cabinet doors are ¼″ perforated hardboard and slide on stock door tracks.

Assemble it with finish nails and glue. Set the nails and fill the holes with putty. Build up the outside edge of the snack shelf on the underside with an additional strip of ¾″ plywood to take a 1½″-wide edging of the plastic. Use contact cement to attach the plastic and the glass top. Give the plywood surfaces a coat of sealer and finish with enamel, or wood stain and wax, to match the woodwork of adjacent rooms.

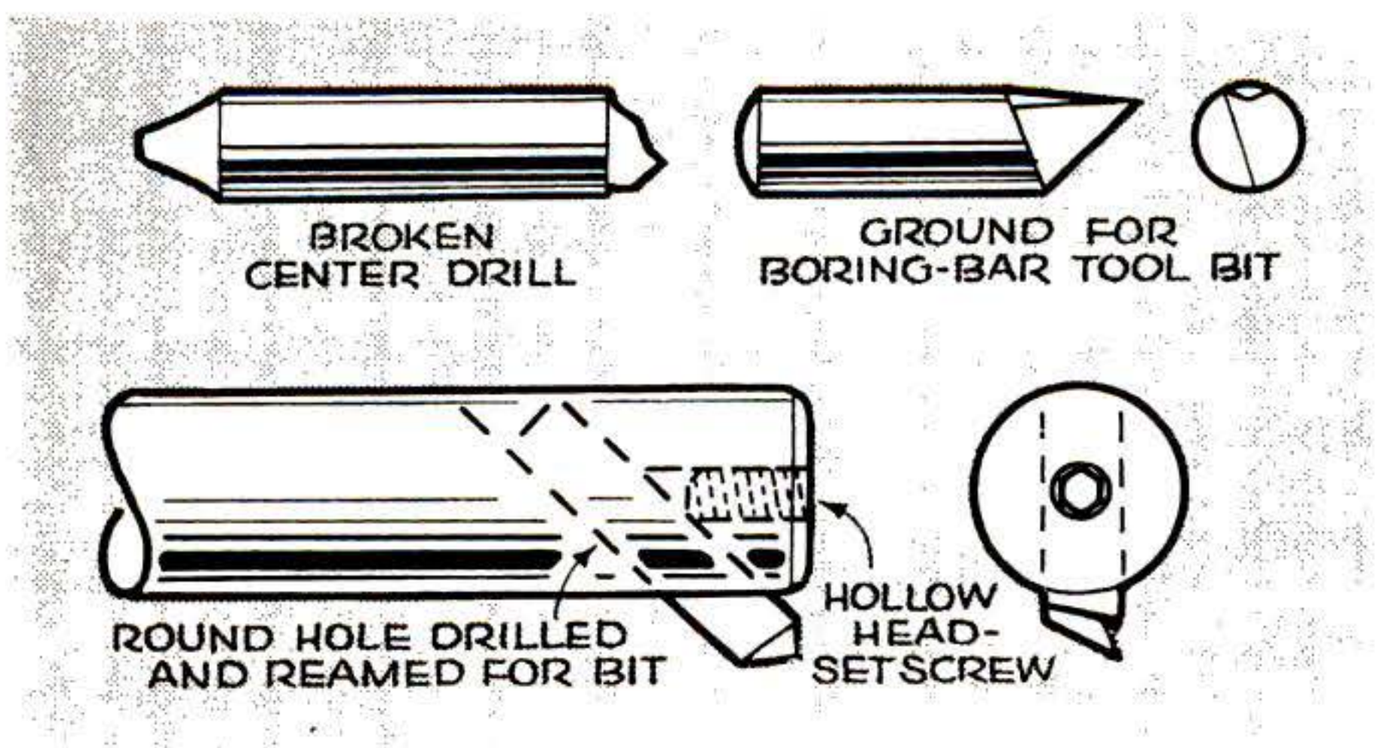
THOMAS B. SHEARER, Flushing, N.Y.

Copyrighted material

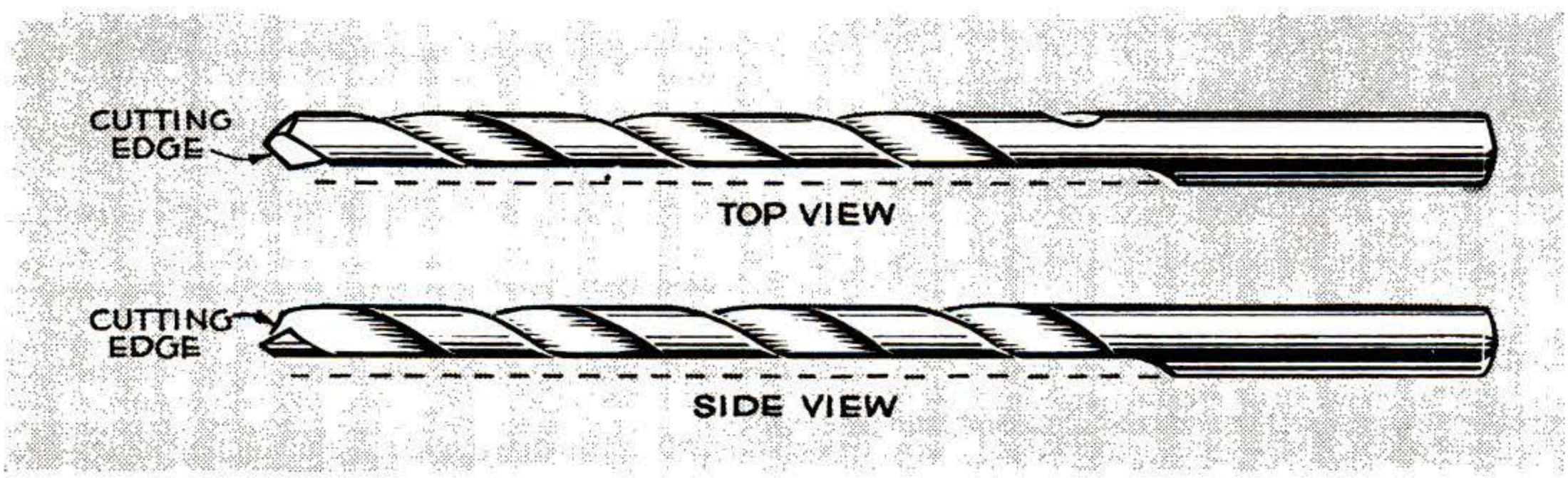
Three Boring Bars You Can Make



1 Make a boring bar for square bits the easy way. Mill or file a slot in the bar and braze another piece of stock in the edge of the slot to leave a square hole. To file the slot, first hacksaw several kerfs to the right depth, then clean up with a file. But how do you hold the filler piece in place while brazing? Just place a square piece of aluminum in the bottom of the slot. The aluminum won't stick, and it's easily removed. For the setscrew, drill and tap through the end of the bar as shown.



2 Broken or discarded high-speed drill shanks and center drills make fine tool bits for boring bars. Just grind down one end to get a proper cutting edge. Use a scrap piece of round stock to make the boring bar. Drill a hole through the bar to fit the bit, as shown in the drawing at left. Then drill and tap a hole in the end of the boring bar to take the setscrew.



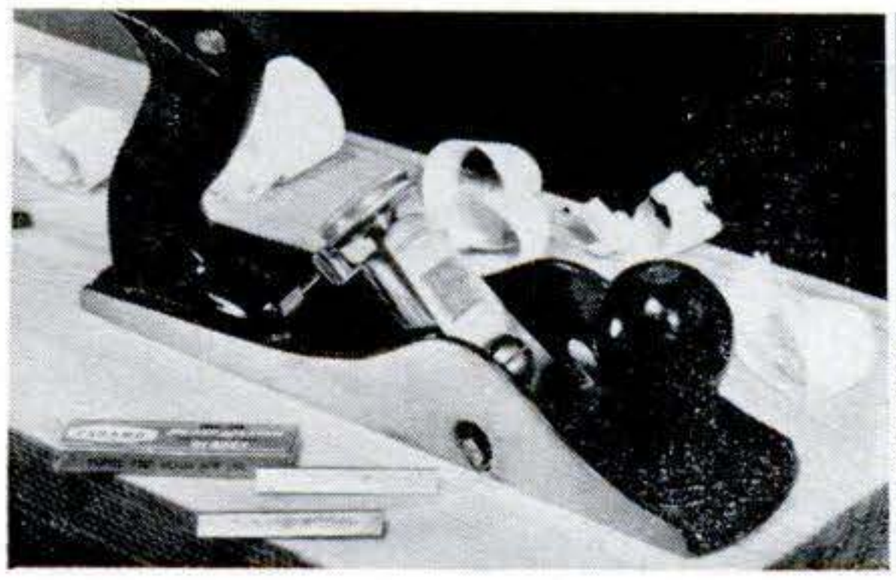
3 A fast way to make a boring bar is to use a broken or junked twist drill. Just grind off some of the flutes behind and beneath the cutting edge as shown in the sketches above. You'll find it works fine. But you'll have to be careful not to make the cuts too heavy. And if you're boring a blind hole, you'll have to reshape the cutting edge of the twist drill so that you can bottom out.

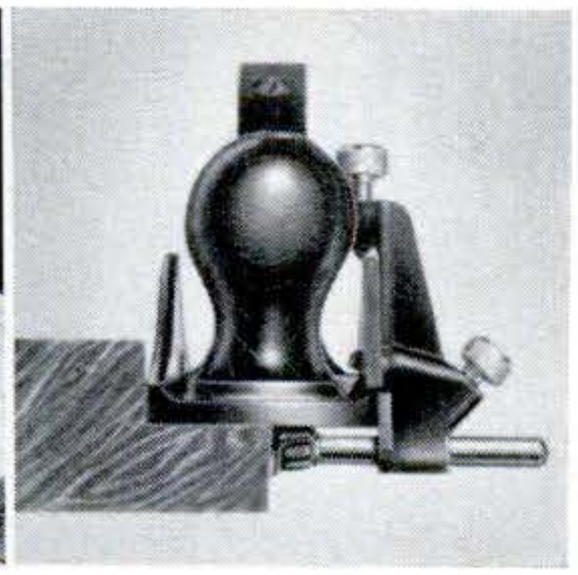
Copyrighted material

Shop Talk

By ROBERT P. STEVENSON

A new plane with throwaway blades we wish they'd import from Britain





A plane with throwaway blades? That's exactly what you're looking at in these pictures. However, you can use the plane—now on sale in England—for both smoothing and rabbeting. For rabbeting, you clamp an adjustable guide (see the first photo at left) to either side of the body for precise width control of the rabbet. A narrow tungsten-steel blade clamps in an open-ended slot extending across the 2" sole. Changing blades is a matter of shifting a cam that permits the old one to drop out of the slot. In England, the blades cost the equivalent of seven cents each, and they are promoted as throwaways—although a honer is offered, too. The maker: F. Parramore & Sons, Chapeltown, Sheffield, England.

The catalogues that woodworking dreams are made of

For stimulating and informative reading, the man with a home shop just can't beat the "wood" catalogues that come along once a year or so. I got mine the other day from Albert Constantine and Son, the New York City firm that has been selling rare cabinet woods—and many, many other related things—since the year the War of 1812 was fought. A fine bonus came with the catalogue—a checklist entitled "101 things to make and things to do in shop and home." With this hanging on the shop wall, I guarantee you'll never run out of enjoyable ideas. To get your own catalogue and checklist, send 25 cents to Albert Constantine and Son, 250 Eastchester Rd., Bronx, NYC. . . . And don't forget that other excellent mail-order source of home-shop supplies: Craftsman Wood Service Co., 2727 S. Mary Street, Chicago 8. Craftsman charges 35 cents for its catalogue. Both houses handle hard-to-find hardware. Next time you can't buy what you want in a local store, check your catalogues. I bet you'll find it there.

The drill kit that comes to you in a prize package

Black & Decker can now claim with good reason that its ¼" utility-drill kit (Model U-113) is a prize package. The Packaging Institute has awarded first prize to the 14-piece kit in a contest that drew entries from 250 manufacturers. The kit is housed in a polyethylene storage and carrying case molded by W. R. Grace & Co., Clifton, N.J. As you can see, there's a form-fitting opening to receive each part of the $16.88 kit.

Helpful instructions for improving and maintaining your home

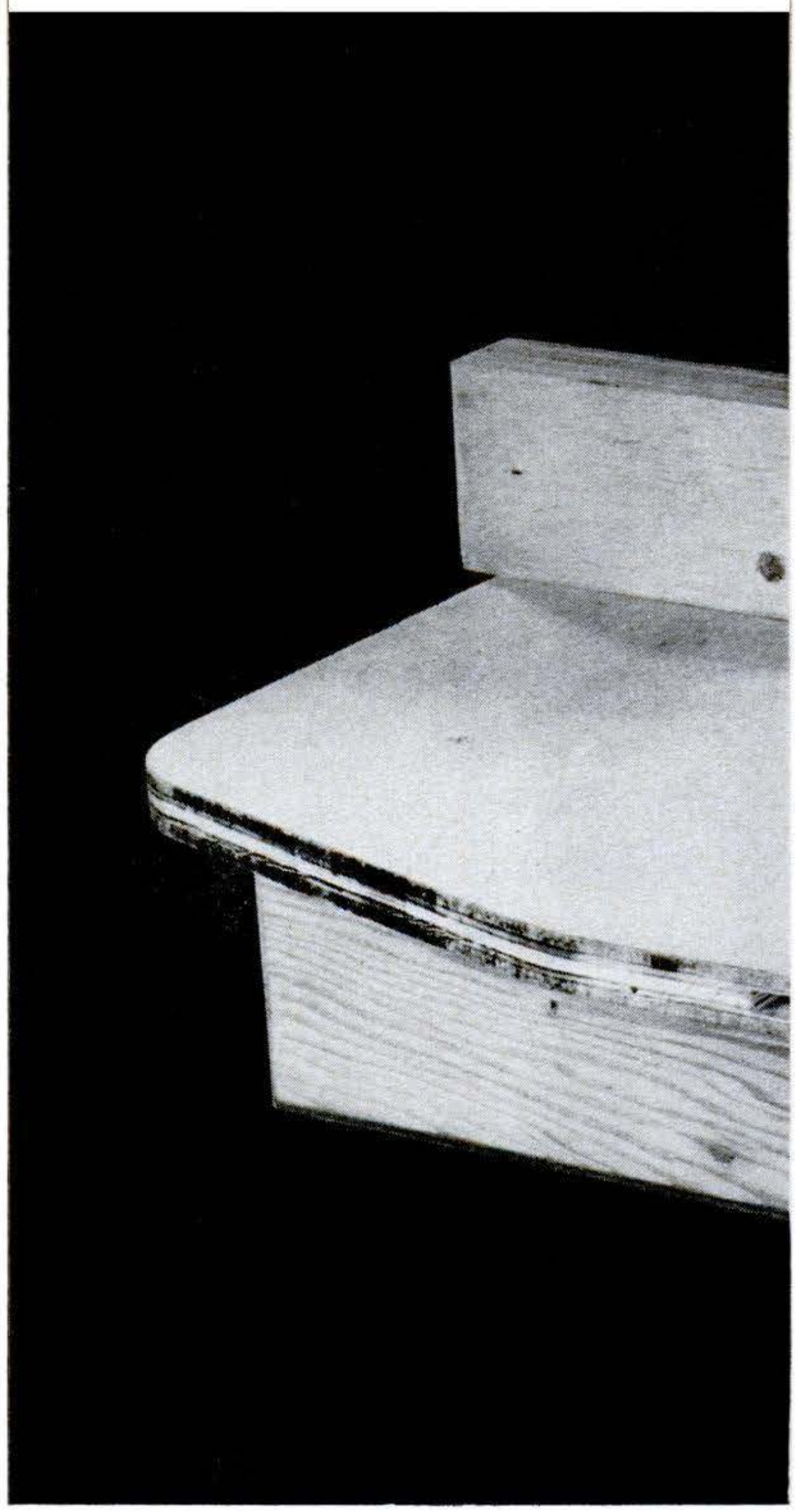
The Grant Pulley & Hardware Corp., West Nyack, N.Y., offers a booklet of 16 space-saving ideas. Price is 10 cents. . . . A five-cent stamp to Western Wood Products Assn., Dept. 520-L, Yeon Bldg., Portland, Ore., will bring you plans for building four useful wall-storage units. . . . A booklet on how to care for solid vinyl and rubber floors is available free from the Rubber Manufacturers Assn., 444 Madison Ave., NYC.

Copyrighted material

How to build a jig that will turn a drill press into—

The Woodworking Champ of Any Shop

By R. J. DE CRISTOFORO



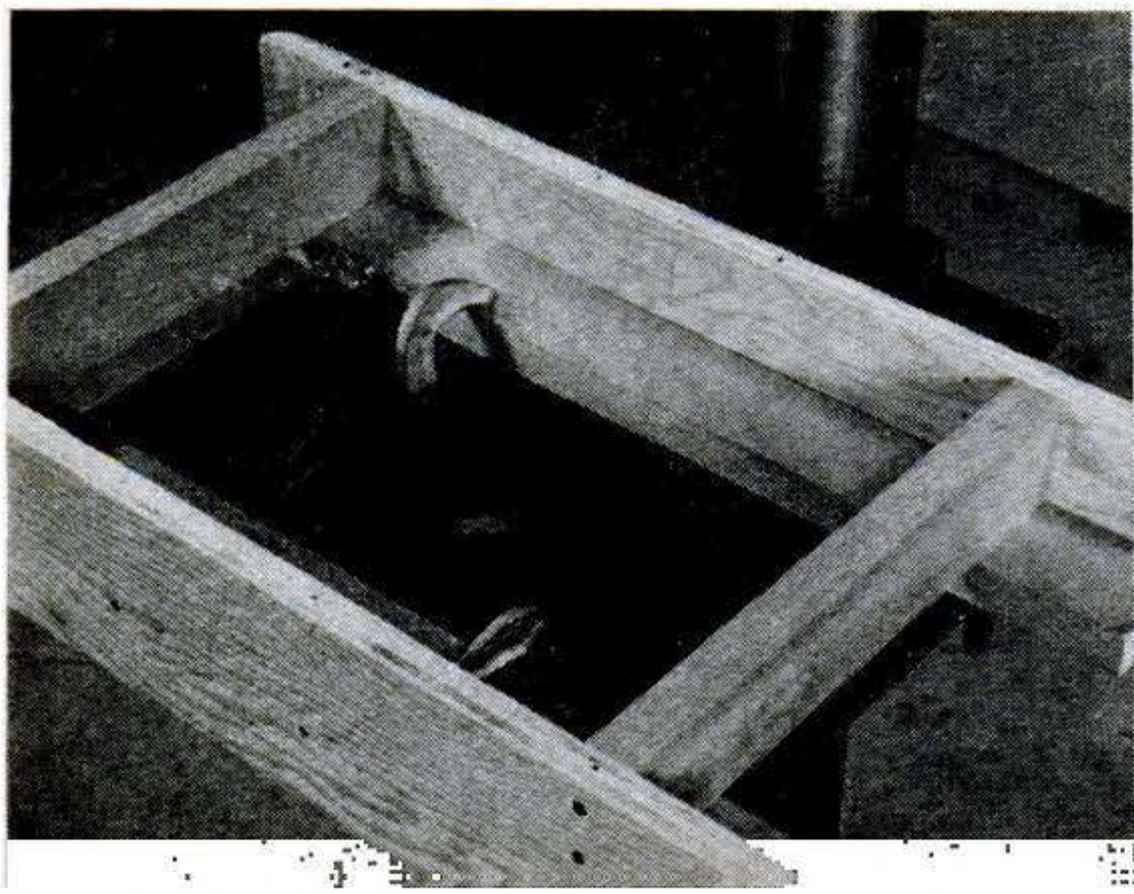
Shaping on the drill press? You need a special table that will cost quite a few dollars. Equally spaced holes on a common centerline? You need a special fence if you wish to do the job accurately and without excessive layout. Drum sanding? Routing? Forming perfect circles or

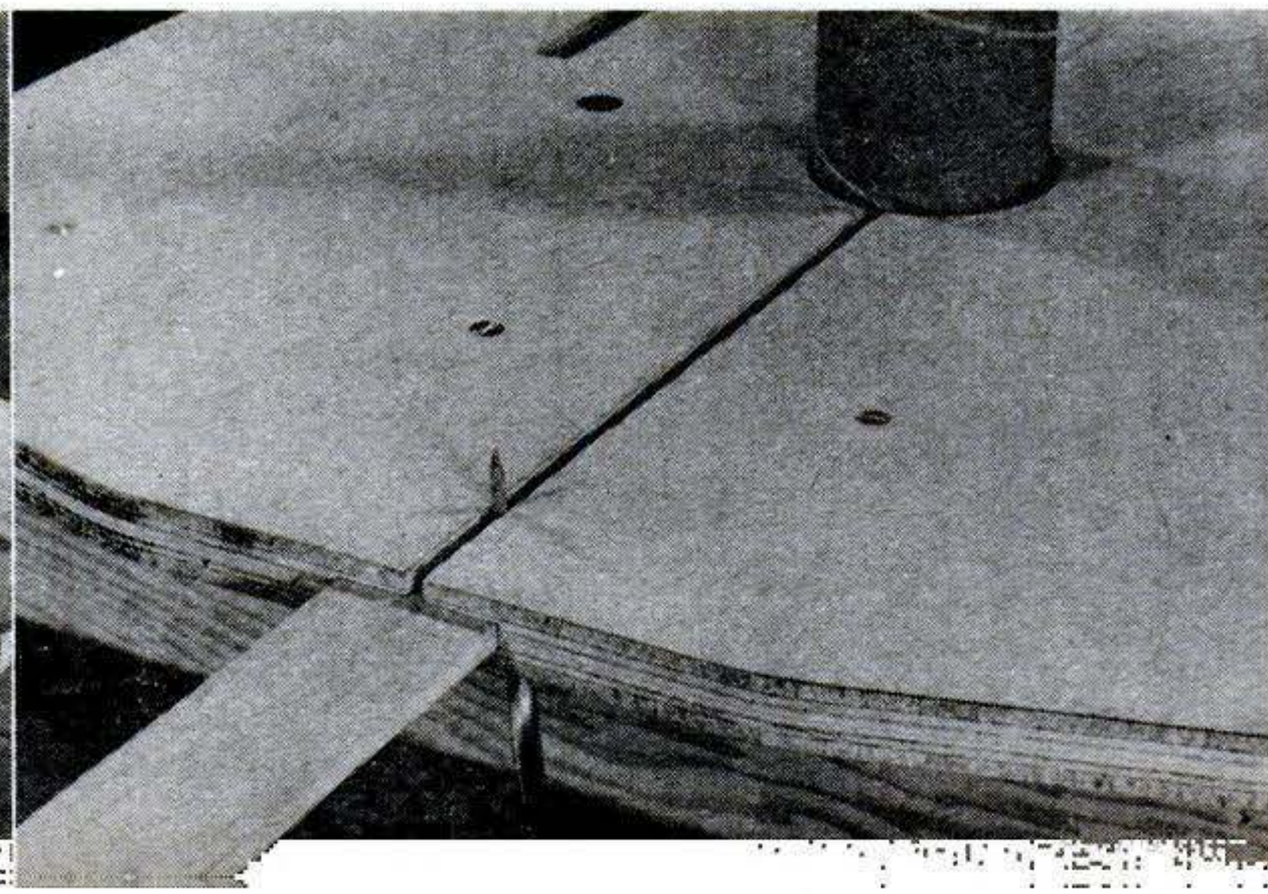
Continued

Here's how it's made

Base assembly fastens to the drill-press table with small C clamps. You may have to change dimensions of the base to suit your drill press, or notch the back apron to fit over the column support. Attach table to base with screws driven into the long members.

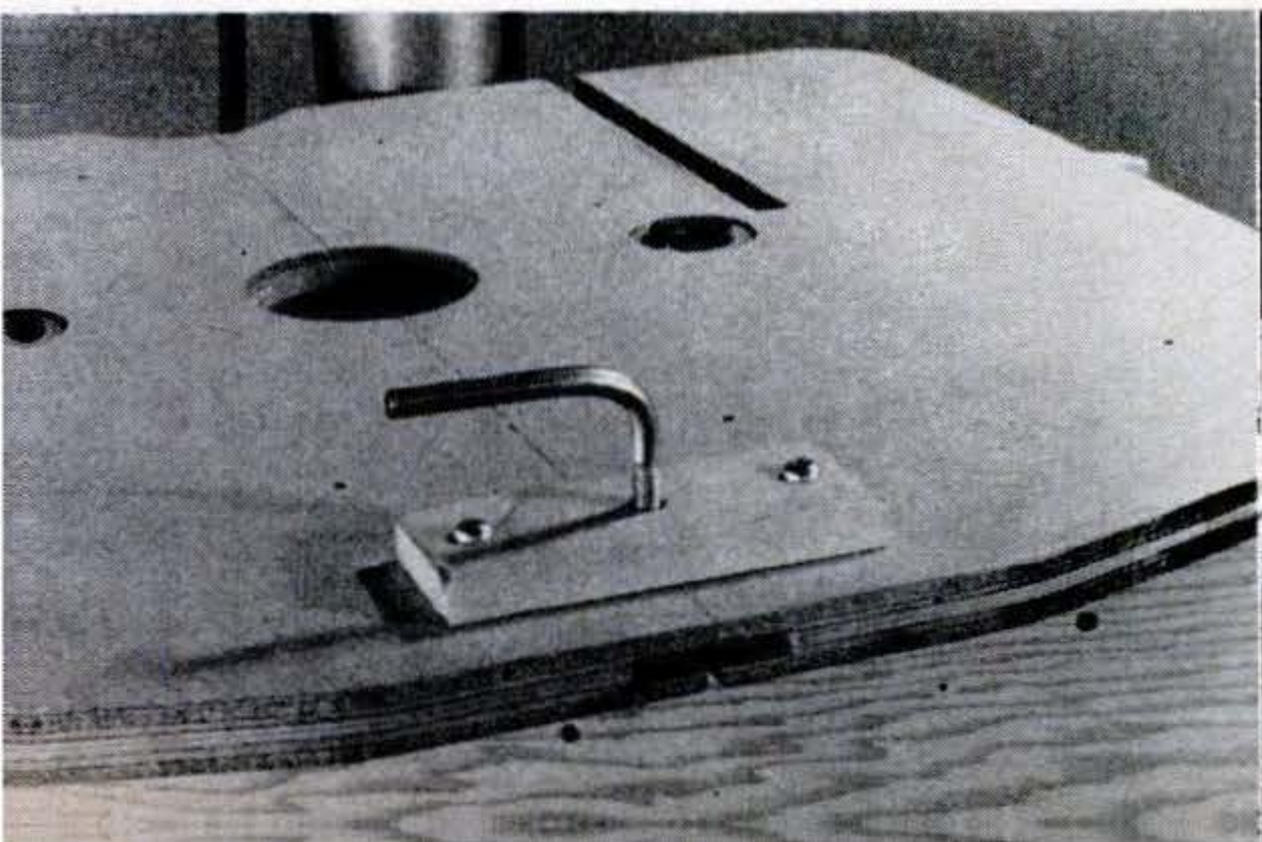
Pivot guide must fit precisely in the table's T slot. Best bet is to cut it a little oversize, then bring it to the final dimension by sanding. Use a roofing nail for the pivot pin. Counterbore the underside of the pivot guide for the head of the roofing nail.

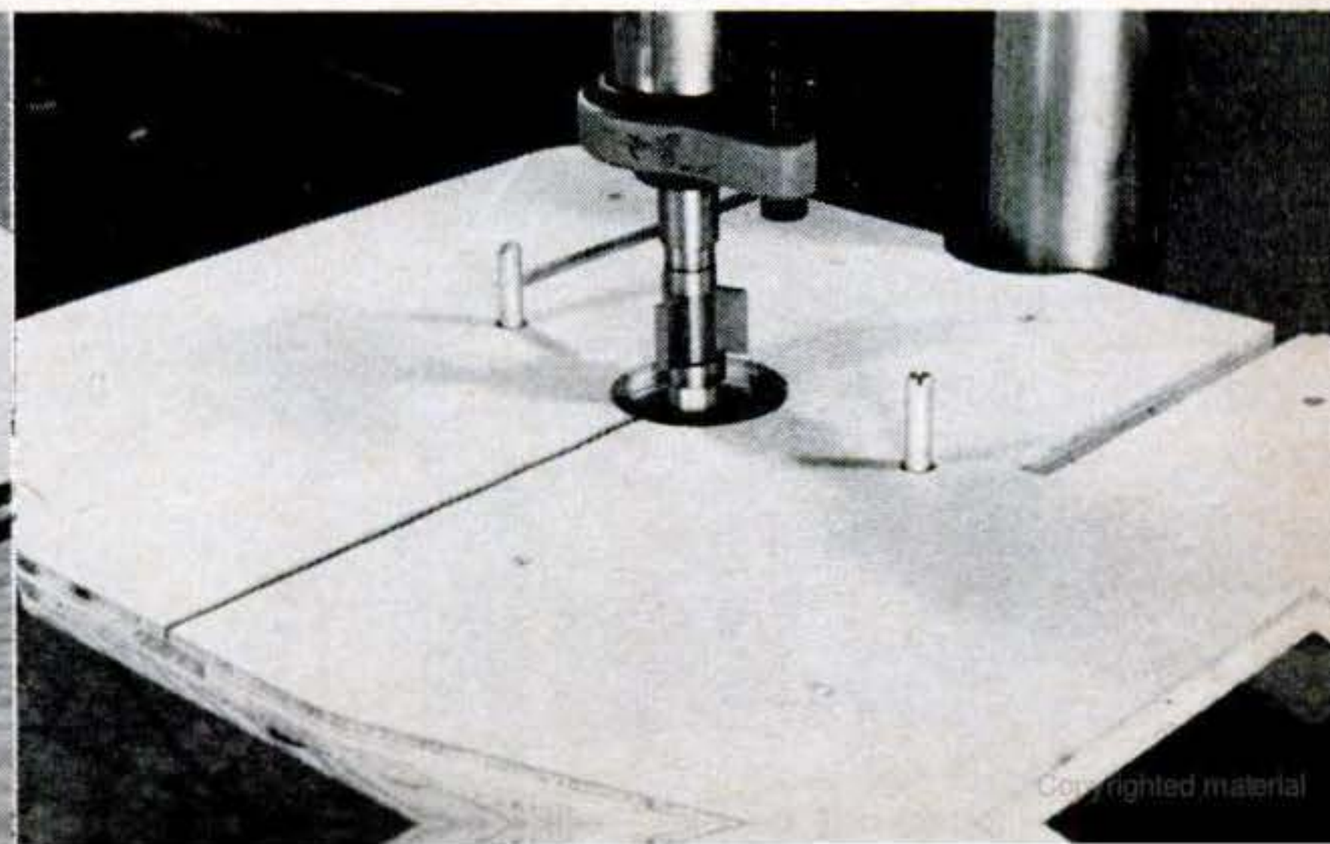




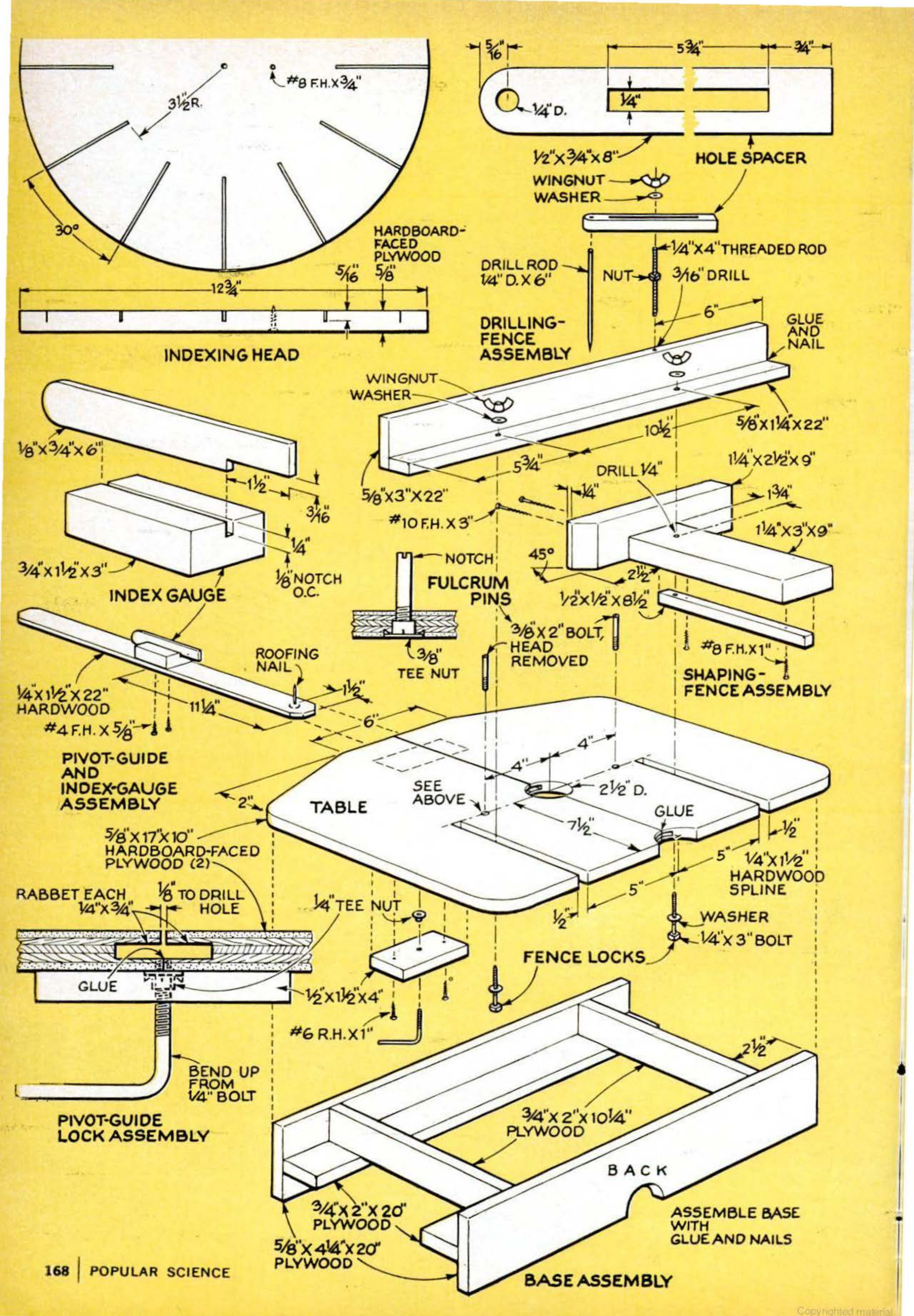
Lock assembly for the pivot guide is attached to the underside of the table with two roundhead screws. Drill a hole through into the T slot so the lock screw can be tightened to bear against the pivot guide. Bend a ¼" bolt to make the L-shaped lock handle.

Fulcrum pins are made from ⅜" bolts. Remove the heads with a hacksaw, then chamfer the cut end. Hacksaw slots in the top of the pins so they can be removed with a screwdriver. The back edge of the table is cut out to fit around the drill-press column.

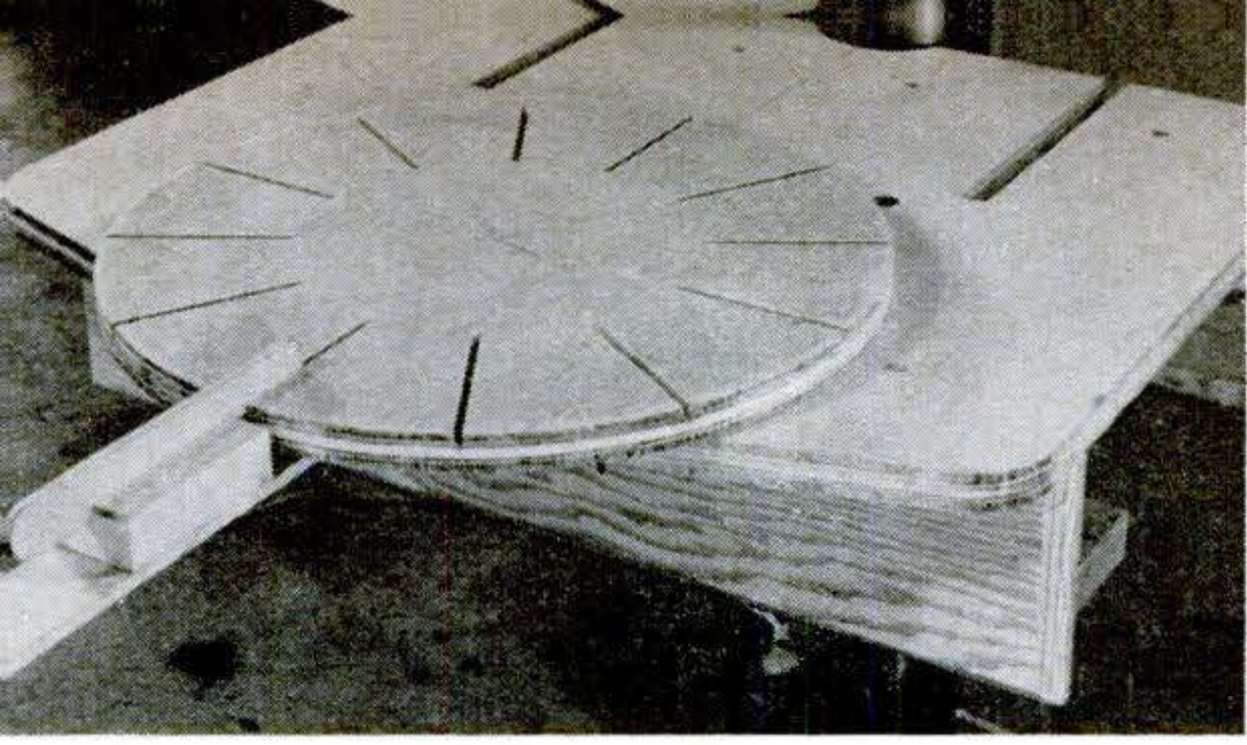




Copyrighted material



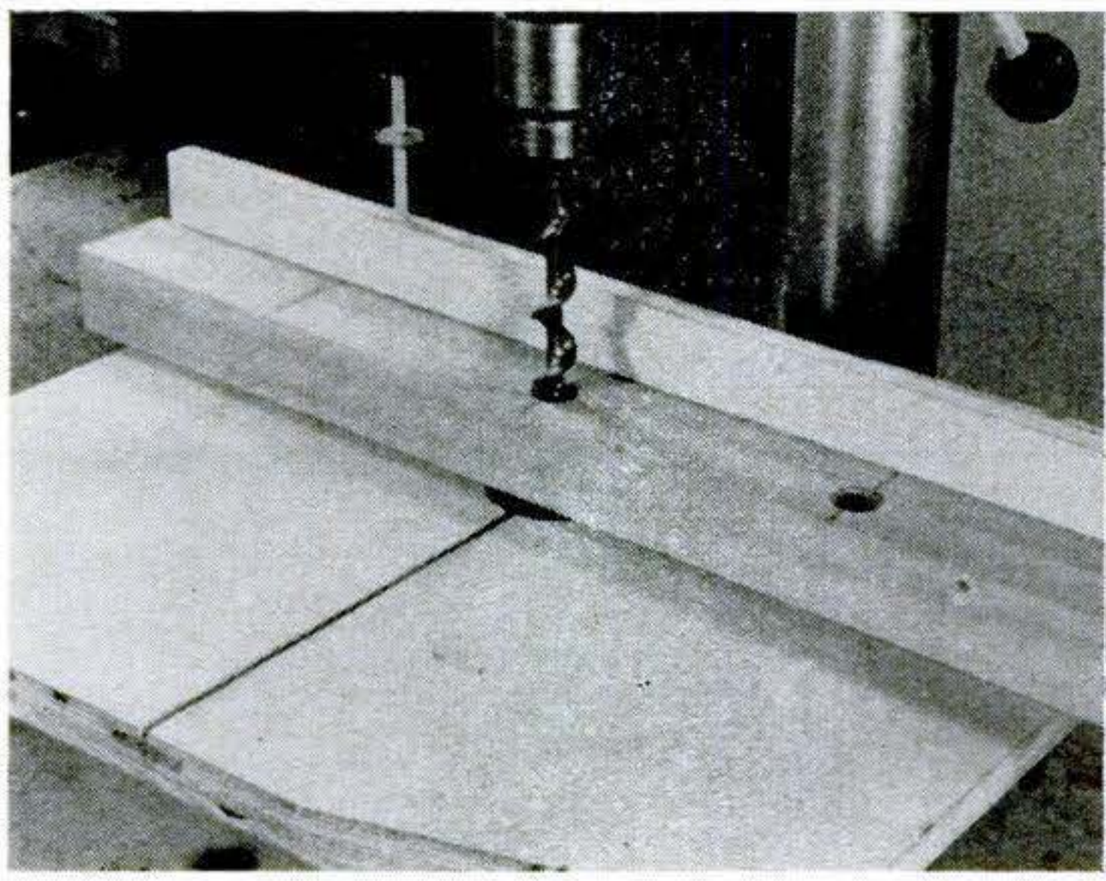
Copyrighted material



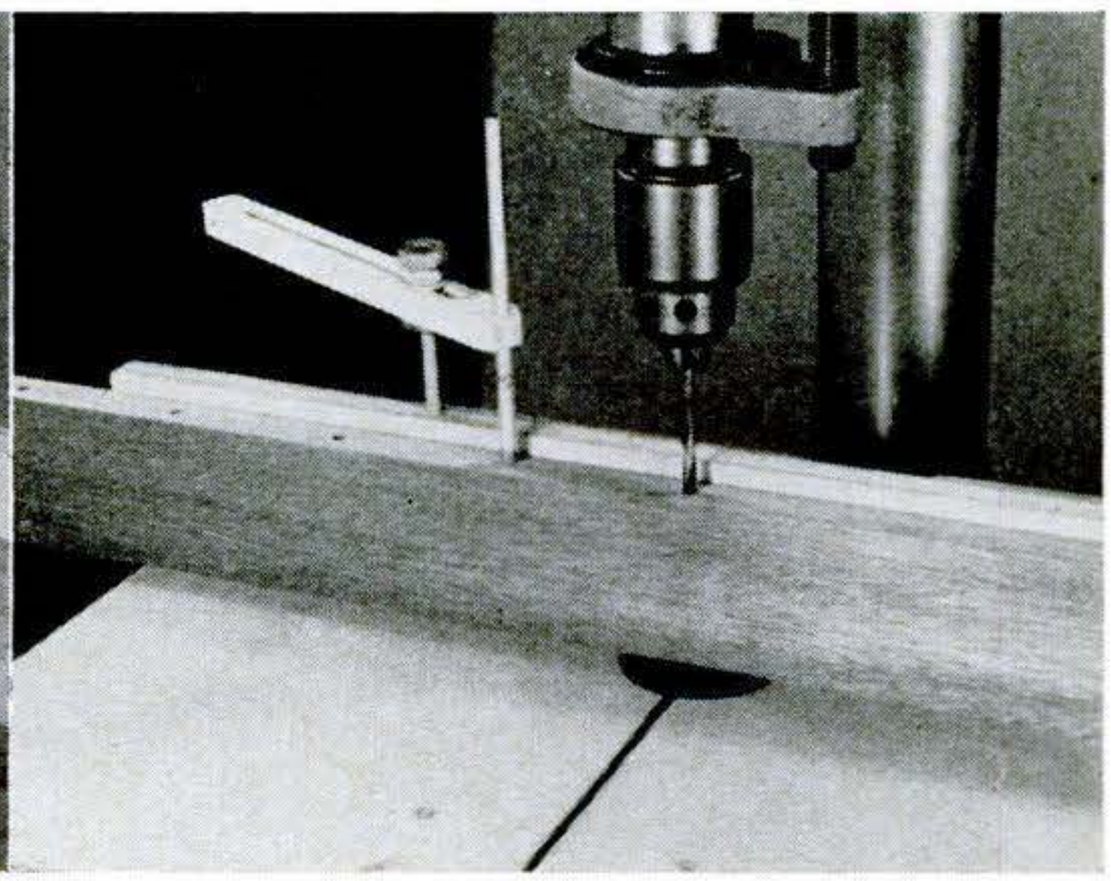
Indexing head mounts on the roofing nail in the end of the pivot guide. The nail goes through the indexing head to hold workpiece. Keep several lengths of nails on hand for different jobs. Bar of the lock assembly fits in the slots in the indexing wheel.

Saw slots in the indexing head, using a semicircular cutout as shown. Set the distance from the rip fence to the center of saw-blade kerf to fall on an exact diameter. Control the length of cut by using a C clamp on the rip fence as a stop. Lay out angles carefully.

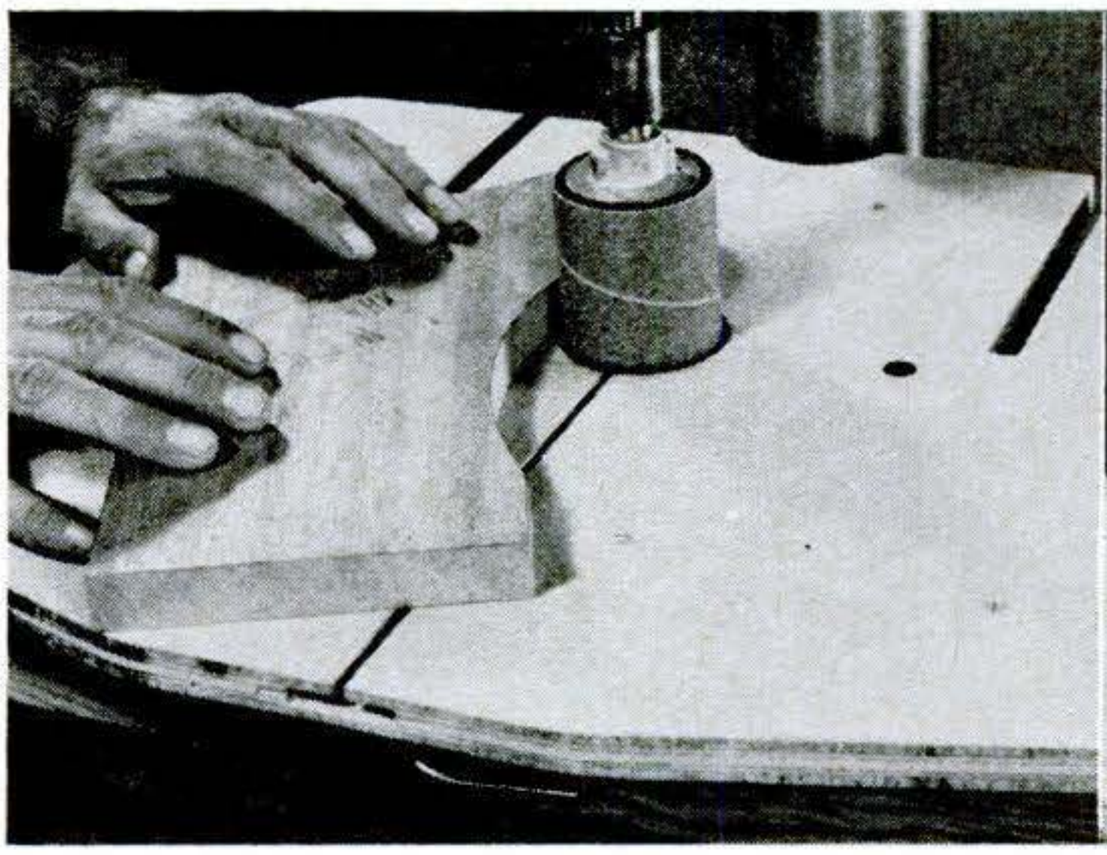
Here's how it works.....



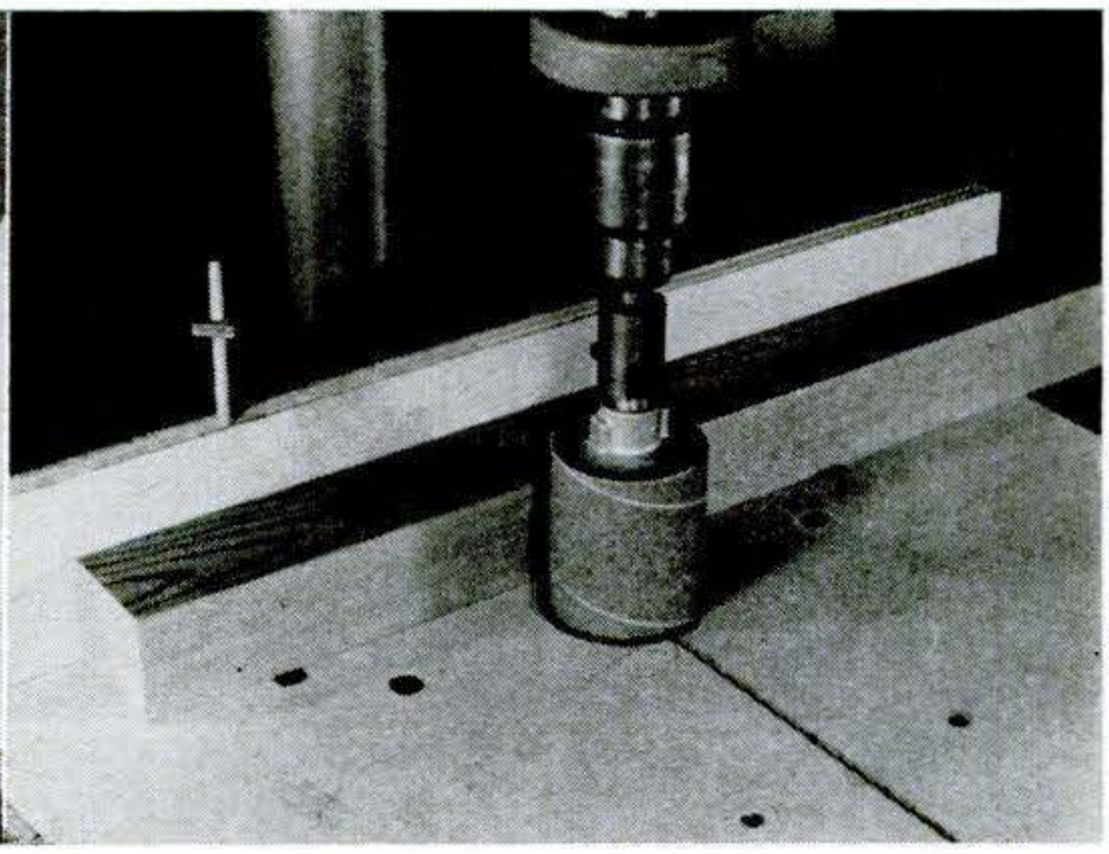
Drilling holes at an equal distance from the edge of the workpiece is simple with the drilling fence. Use the same locks that hold the shaper fences. When drilling a through hole, put a scrap block under the work to prevent splintering on breakthrough.



Hole spacer automatically sets equal distances between holes when drilling. Drill the first hole, space the work for the second hole, then set the pin to engage the first hole. Subsequent holes will be equally spaced. Tapered pin fits holes up to ¼".

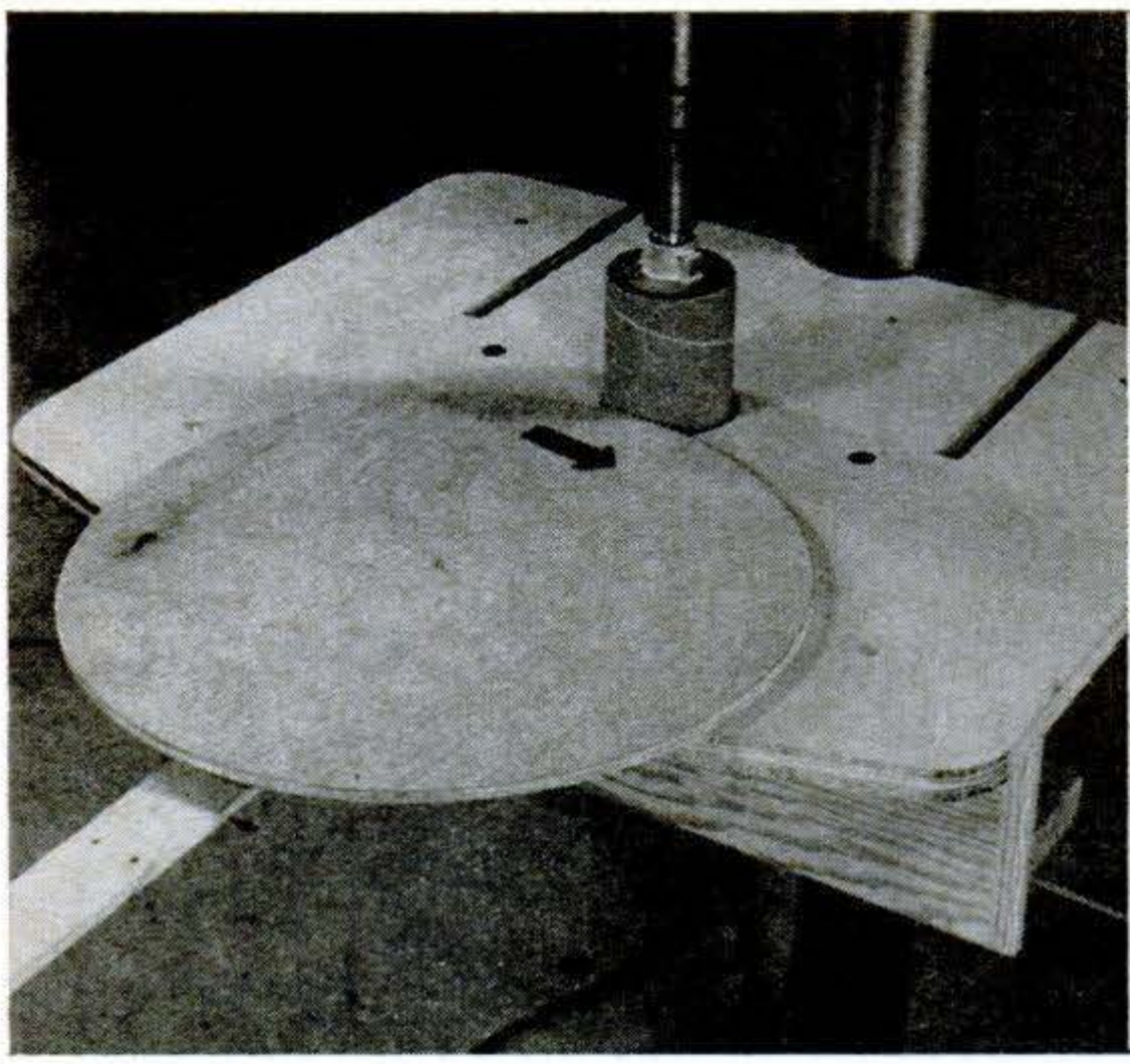


Drum sander mounted in the drill-press chuck runs inside the table's center hole. The hole should be large enough to fit your largest drum sander, but not larger than 3". You can use the entire length of the sanding sleeve by moving the quill up or down.

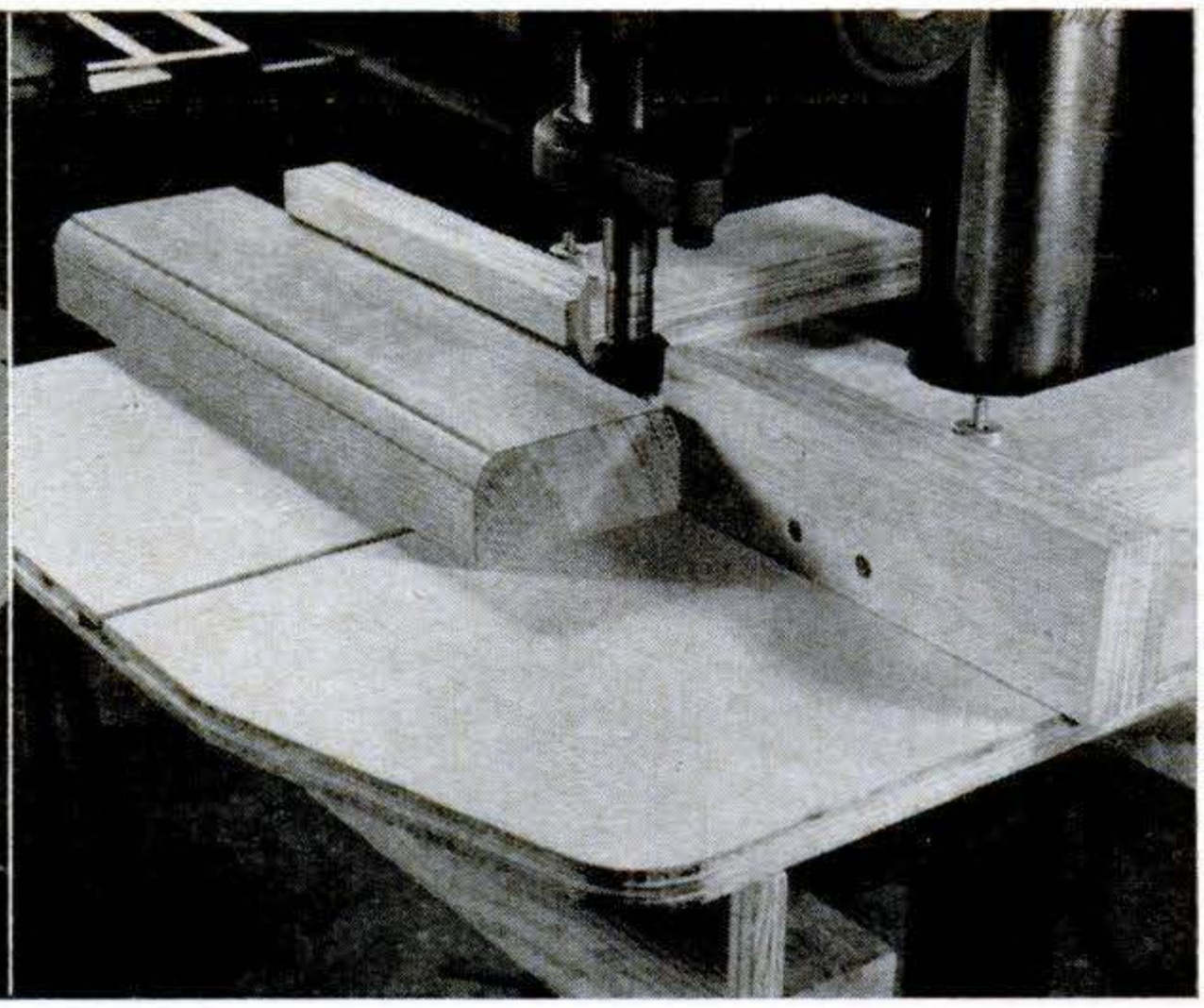


Drum-sander jointing is done by using the drilling fence in combination with the drum sander. Don't try to remove too much material in one pass; it might put too much strain on the spindle. Always feed in the direction opposite to rotation of drum. *Continued*

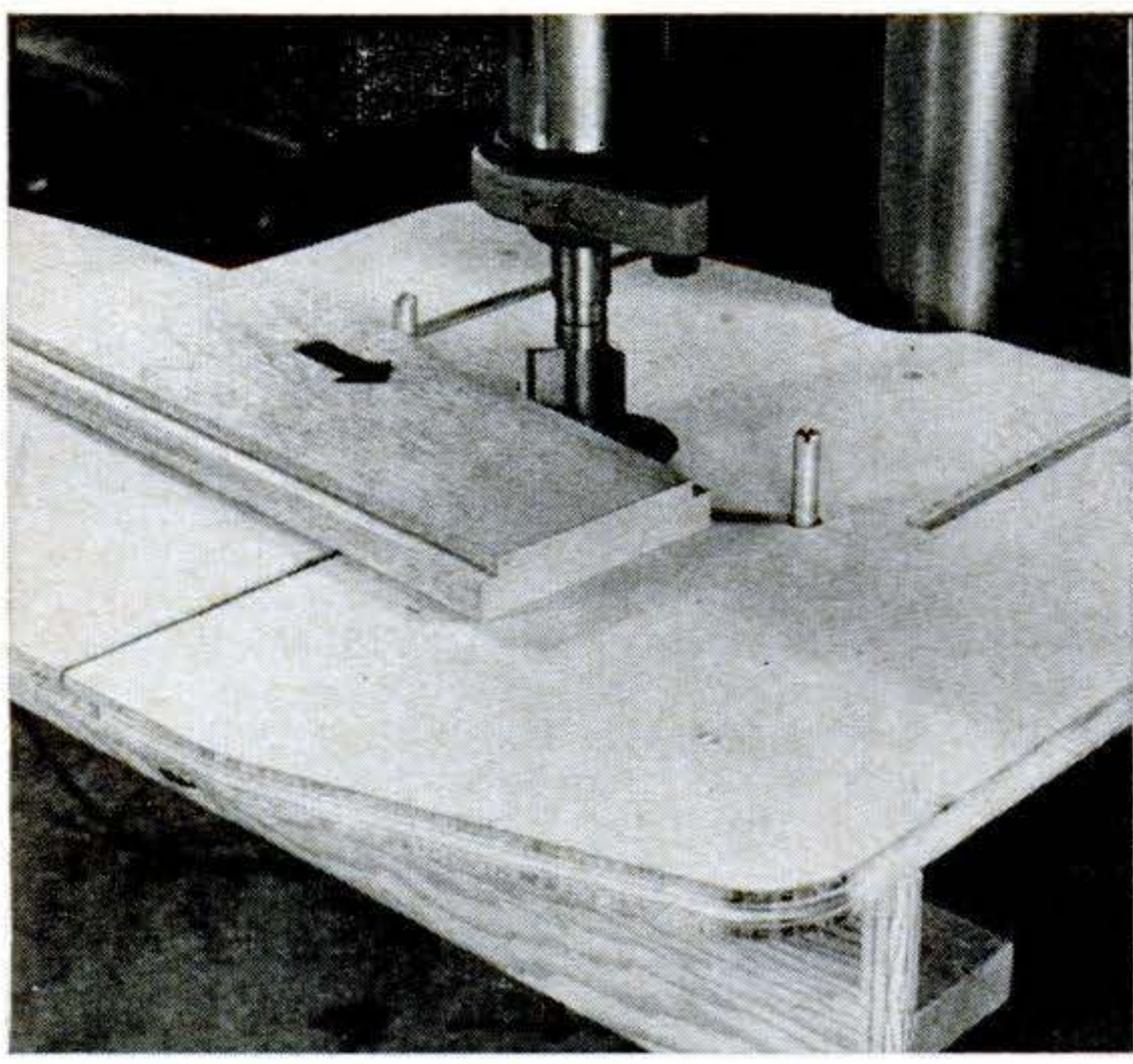
Copyrighted material



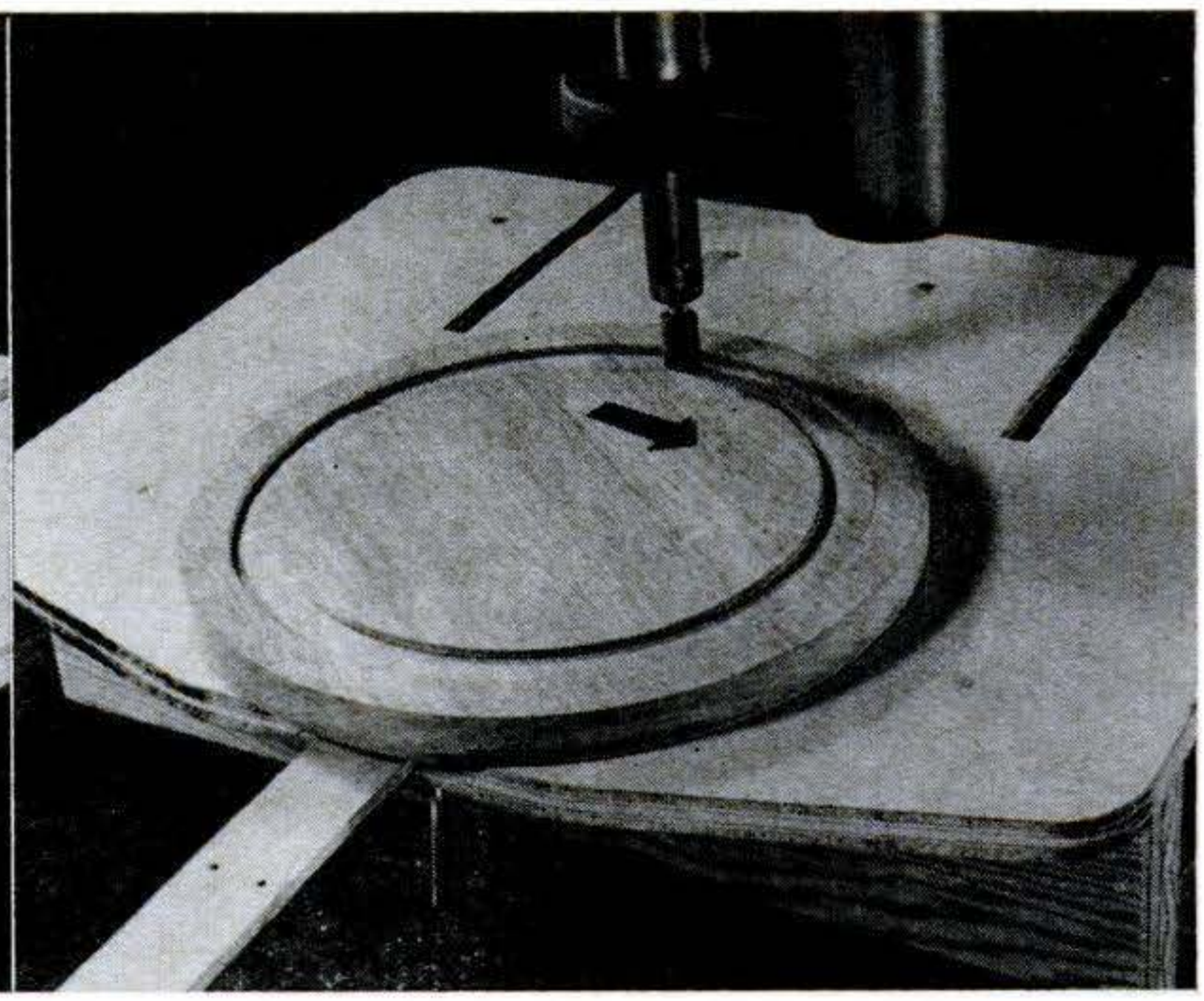
Pivot-sand perfect circles by first cutting the work slightly oversize; then mount the work on the pivot pin and move it forward to engage the drum. Lock the pivot guide and slowly rotate the work to do the sanding. Arrow shows direction of rotation.



In-line shaping, when only part of the edge of the stock is removed, is done with the shaper fences on the same plane. For smooth cuts, use a high drill-press speed and slow feed. When possible, feed the stock so the cutter works with the grain of the wood.



Freehand shaping is done against the fulcrum pins. Hold the work firmly against the infeed pin, then advance it slowly to meet the cutter. Collars on the cutter shaft control cut depth. At the end of the cut, the work is supported by the outfeed pin.



Rout circular grooves by placing the work on the pivot guide as shown. Straight routing is done against the drilling fence. Freehand routing is done without fences on the table. Rout deep grooves by taking light cuts and making repeat passes.

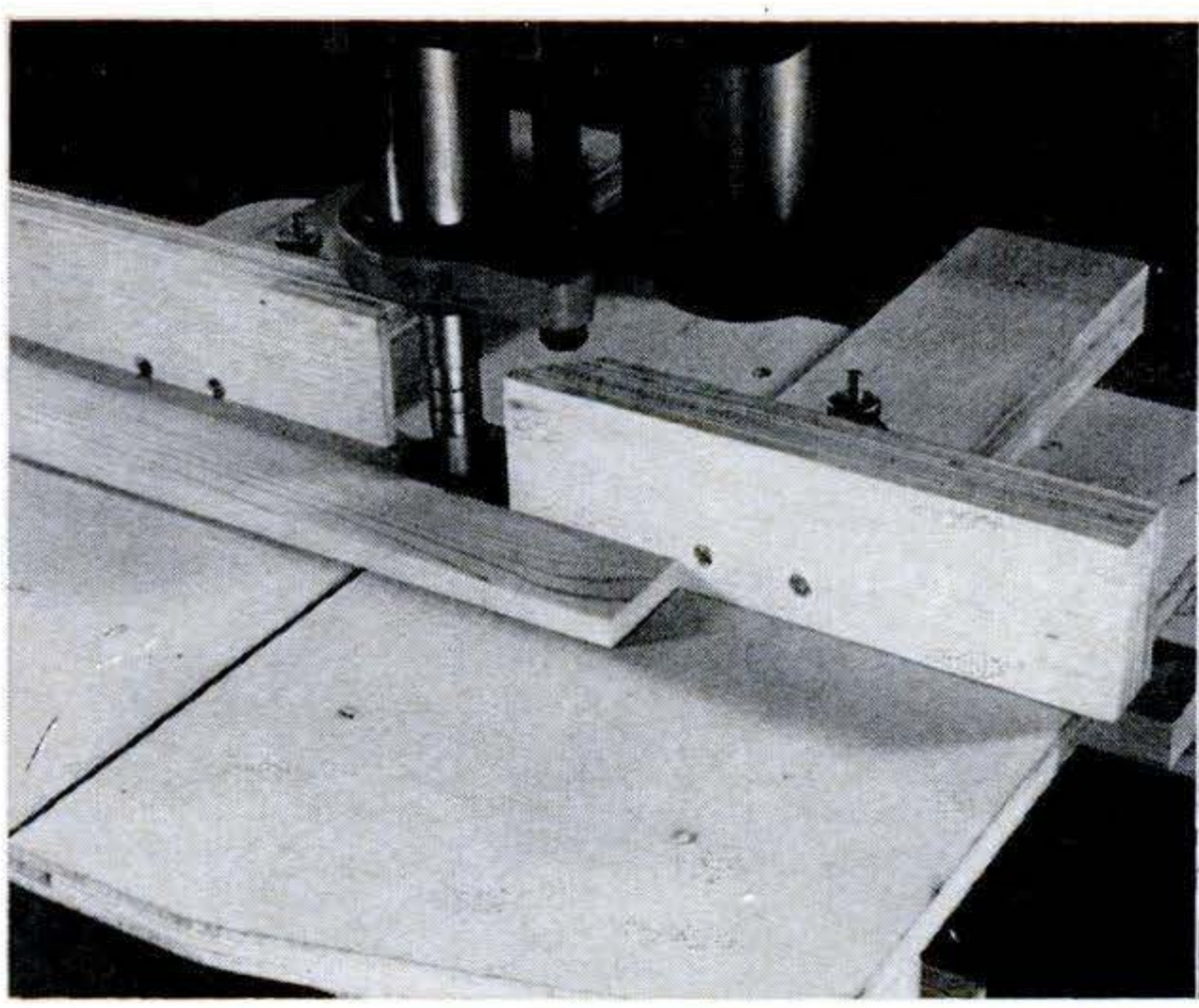
shaping the edge of a disk? All these jobs can be done on a drill press. The catch is that you must add accessories or make special setups each time.

This master jig—a combination tool that can be used on any bench- or floor-model drill press—has more talents than a decathlon champ. With it, you can handle most special-equipment jobs in your shop, and rarely will you have occasion to remove it from the drill press.

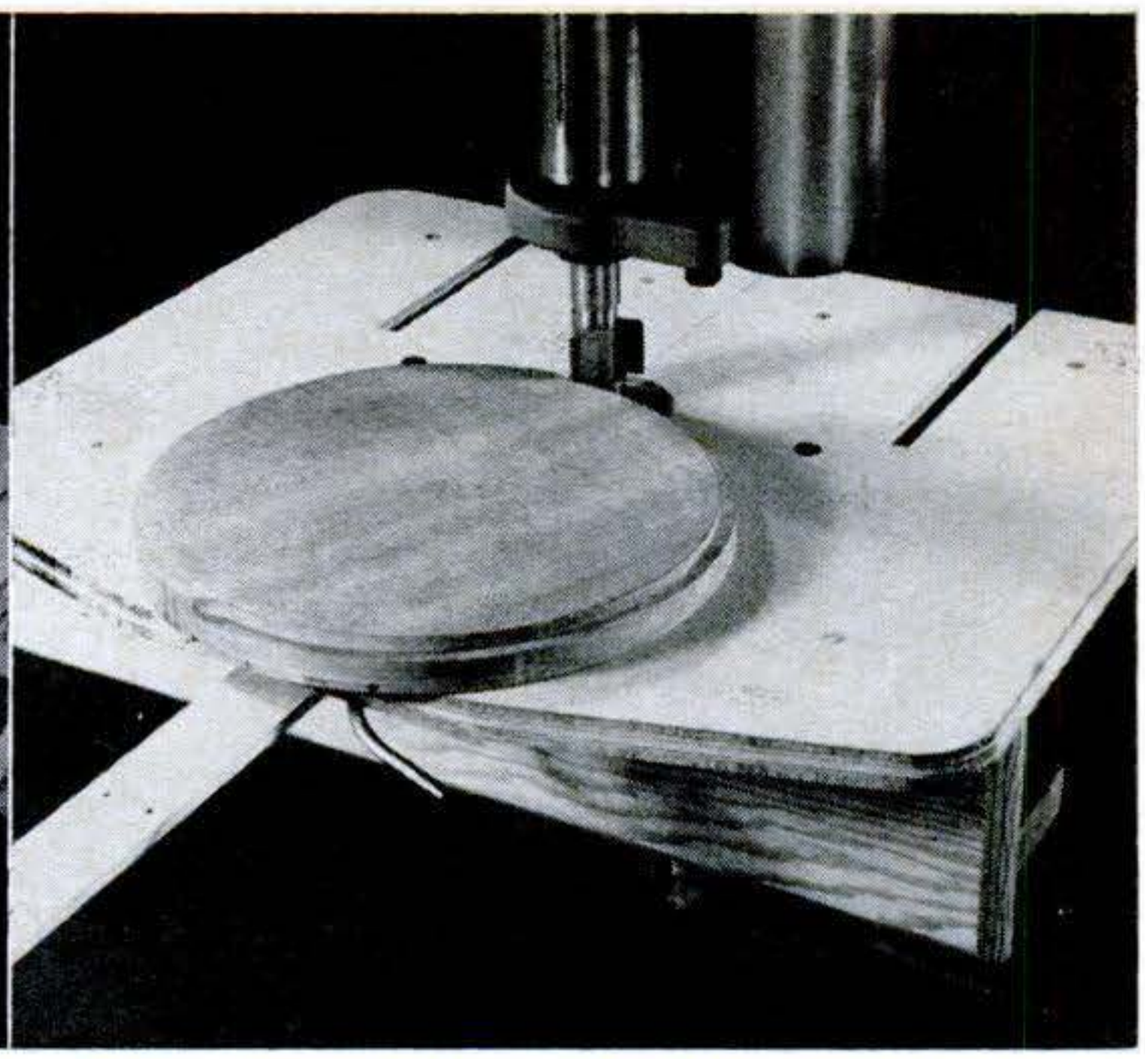
What it is. Basically, it's a table attached to a base secured to the regular drill-press table by two C clamps. The table hole centers under the drill-press spindle and permits the use of drum sanders and three-lip shaper cutters. Individually adjustable fences are used for shaping straight-line work. Fulcrum pins support curved work that must be shaped freehand.

A drilling fence is locked in place of the shaping fences for drilling holes at equal

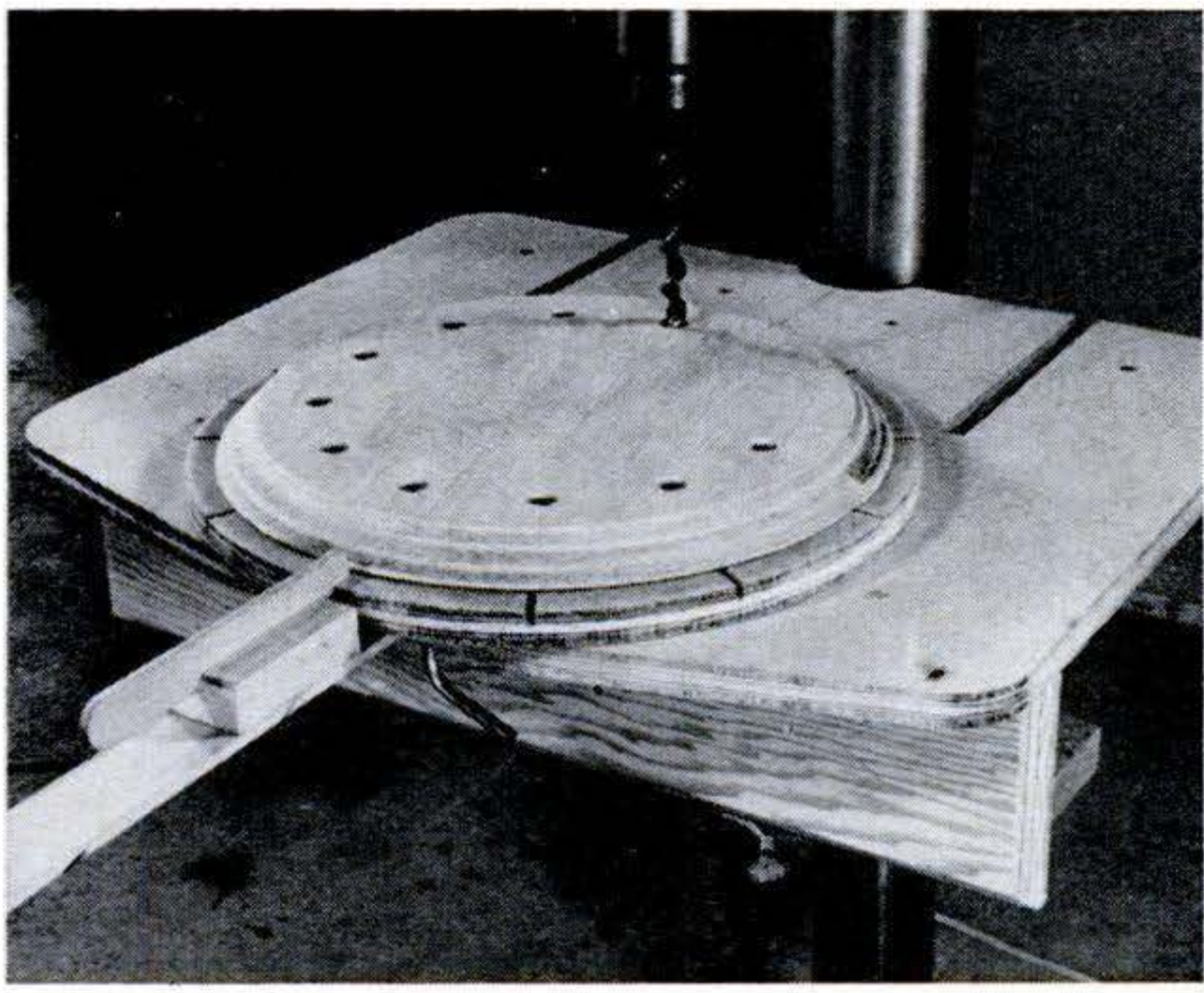
Copyrighted material



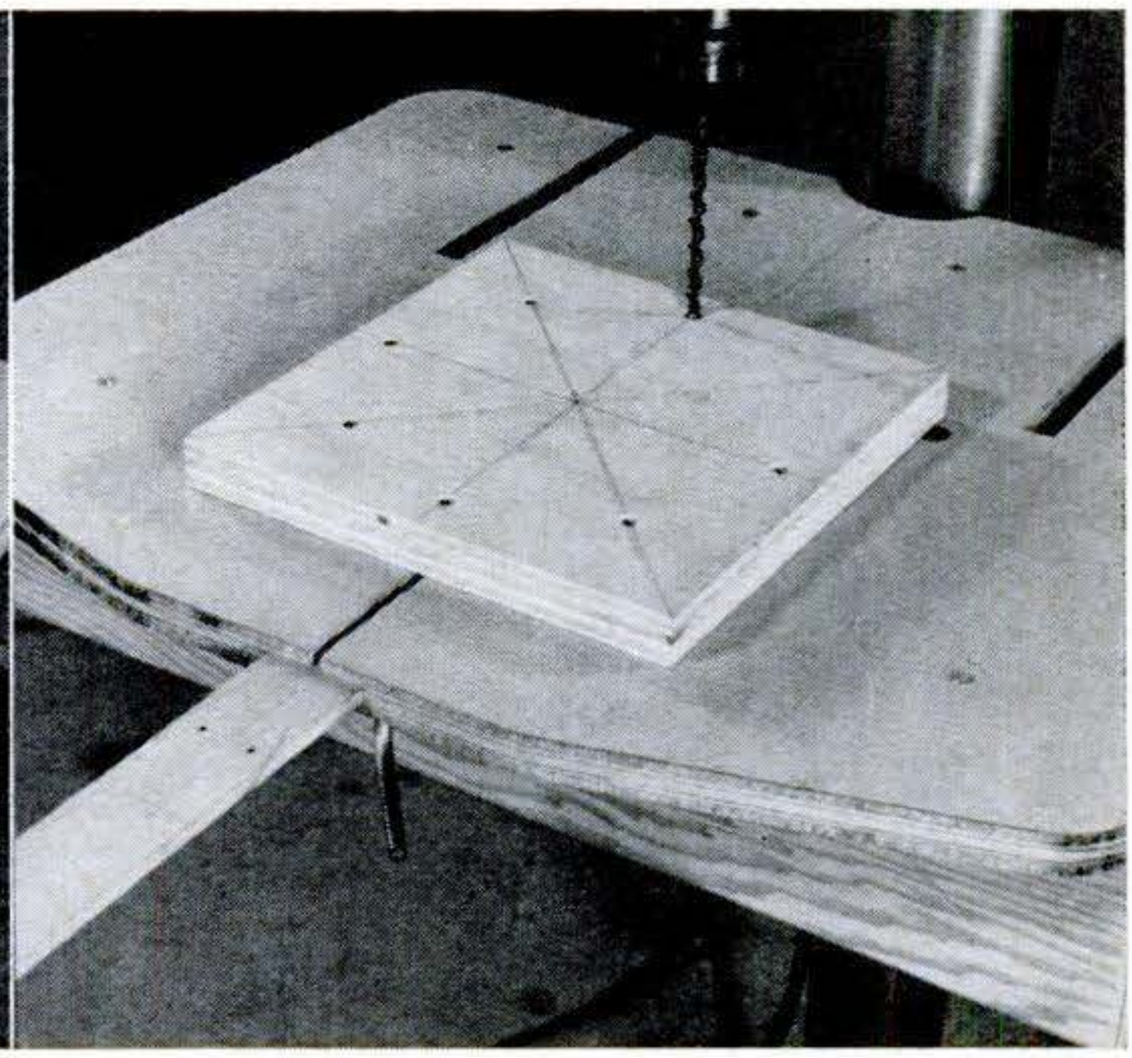
Shape the entire edge of a piece of stock by moving the outfeed fence forward to support the stock after the cut. To do this, adjust the infeed fence for the cut, feed the stock about an inch past the cutter, then move the outfeed fence forward to new edge.



Shape circular edges using the pivot guide. It's best to hold the stock firmly, and not to remove too much material in one pass. You'll get a better cut if you use repeat passes to make deep or wide cuts. Rotate work in the opposite direction of the cutter.



Indexing head is used on the pivot pin with the index-gauge assembly attached to the pivot guide. For larger work, make a bigger wheel. Make more slots to get more indexing capacity. The off-center projecting screw-point holds the work in place.



Indexing without the indexing head is done by first making a layout. You use the pivot guide alone for drilling on a circle, and space the holes according to the layout. This way you're not limited by the spacing of the slots in the indexing head.

distances from the edge of the work. A built-in spacer automatically controls distance between holes.

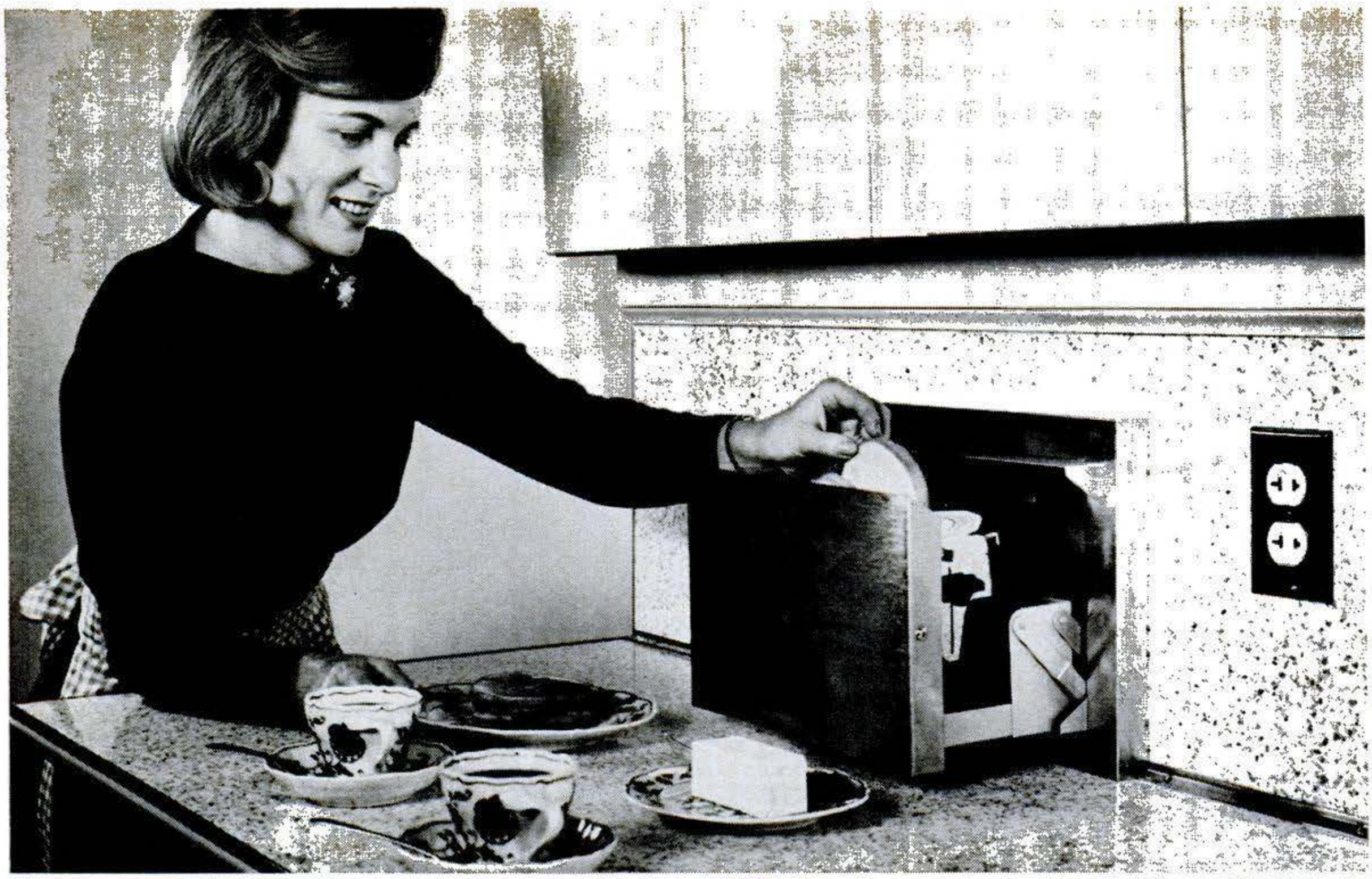
A unique feature is a pivot guide, which slides in a T slot formed in the table. The guide can be set at any distance from the spindle and locked in place. With the pivot guide, you can rotate work against cutting tools such as shaper cutters or router bits, or against a drum sander.

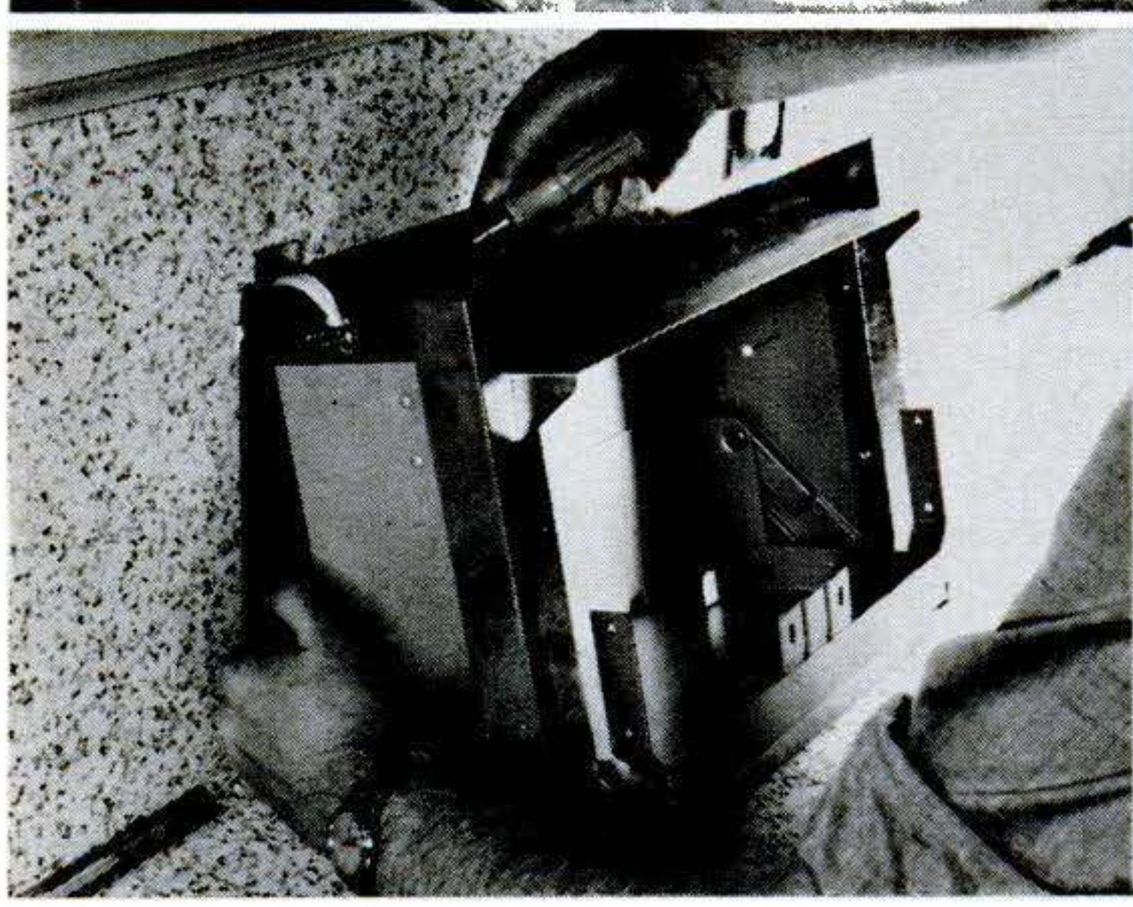
The indexing-head and index-gauge assembly can be mounted in seconds on the pivot guide. Among other things, this setup makes it a snap to drill equally spaced holes on a circle.

How to build it. First check the dimensions of the base assembly against the size of the table on your drill press. The only change that may be necessary is reduction or increase of the overall width. It's a good idea to assemble the base so it can be used

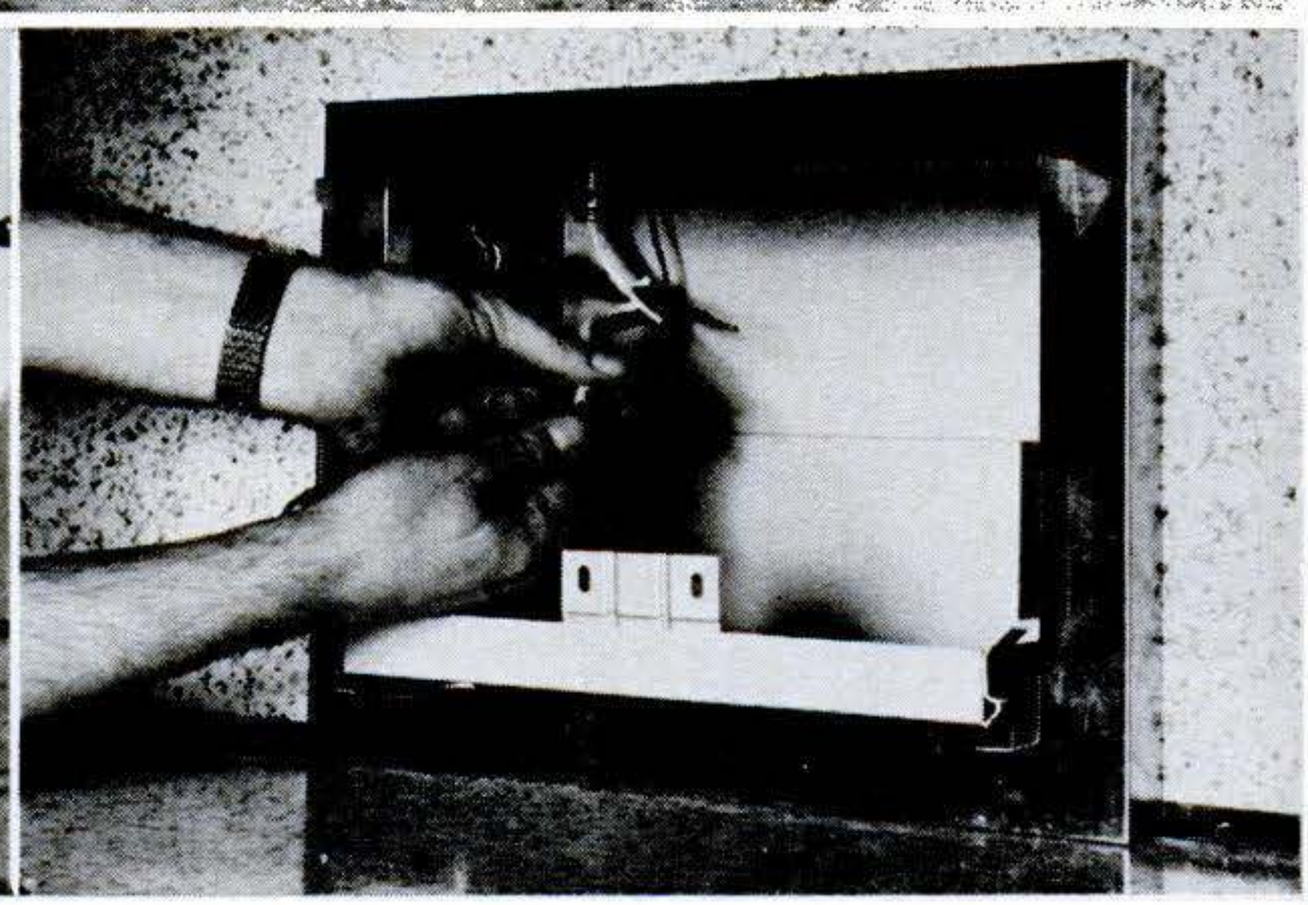
[Continued on page 204]

Copyrighted material





Run No. 12 plastic-sheathed cable from a 115-volt outlet through the wall to the junction box in the back of the housing. Anchor it with a cable clamp.



Make electrical connections in a back corner of the housing and cover them with a metal box. Temporarily remove the front panel for easy access to the wires.

PS HOME IMPROVEMENT

The Toaster

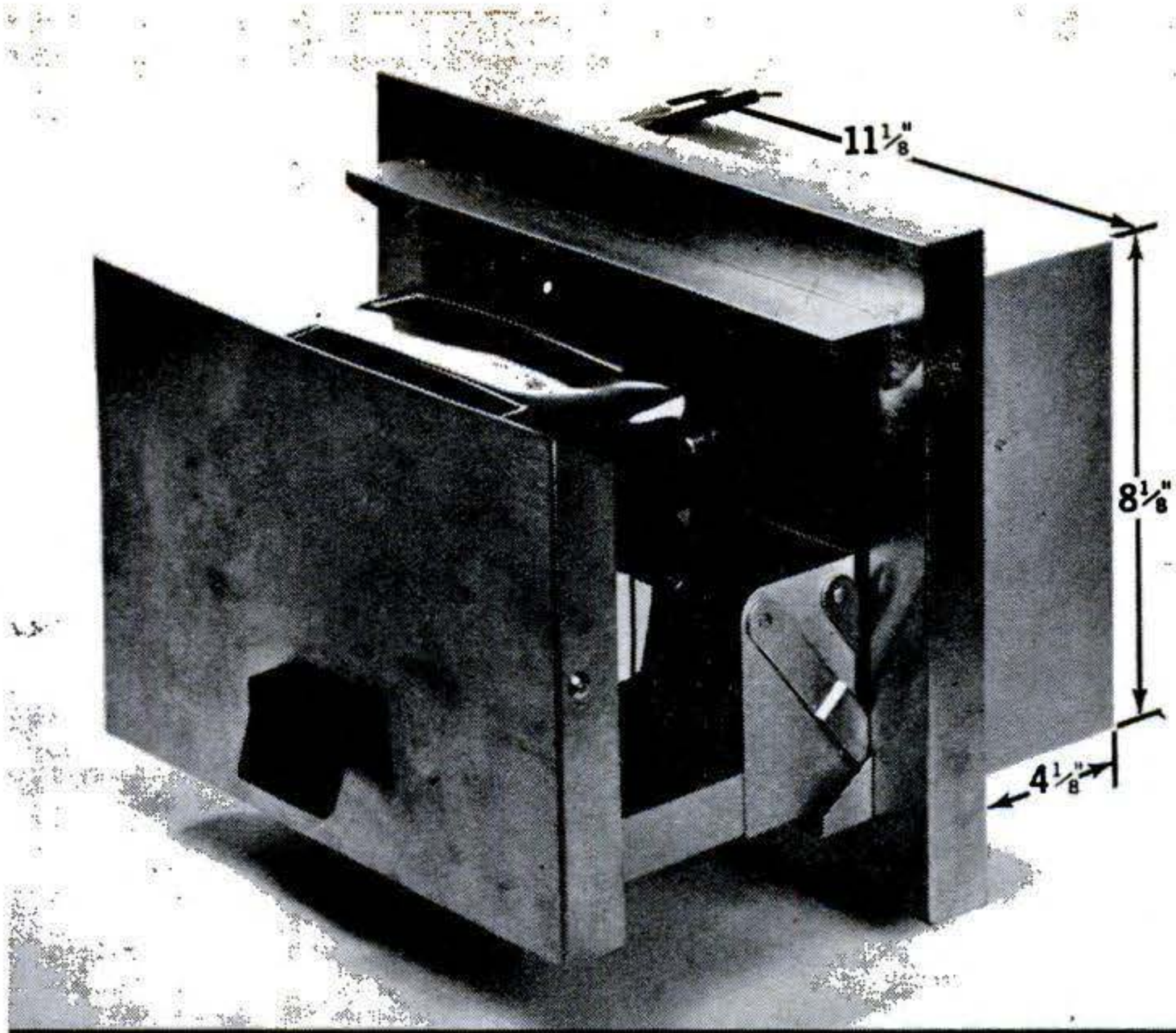
By JOHN BURROUGHS

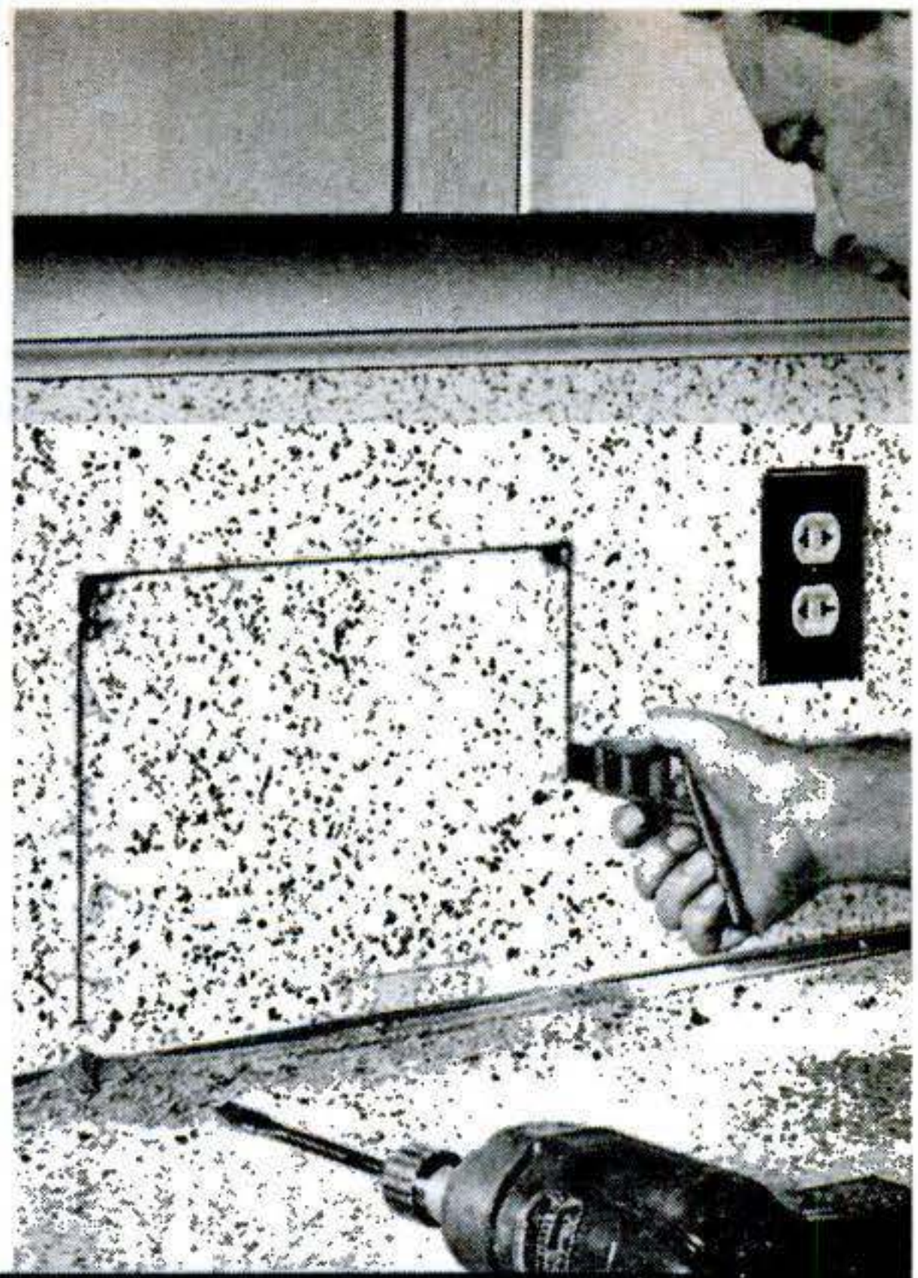
Here's something new in toasters—one that mounts in the wall behind a kitchen counter, breakfast-room table, or snack bar. Just pull out the carriage and there's a two-slice automatic pop-up toaster ready to use. When you're through, push it back into the wall to clear the counter space.

A switch disconnects the power when the carriage is pushed into the housing. You can unplug the toaster and lift it out for cleaning or for use elsewhere.

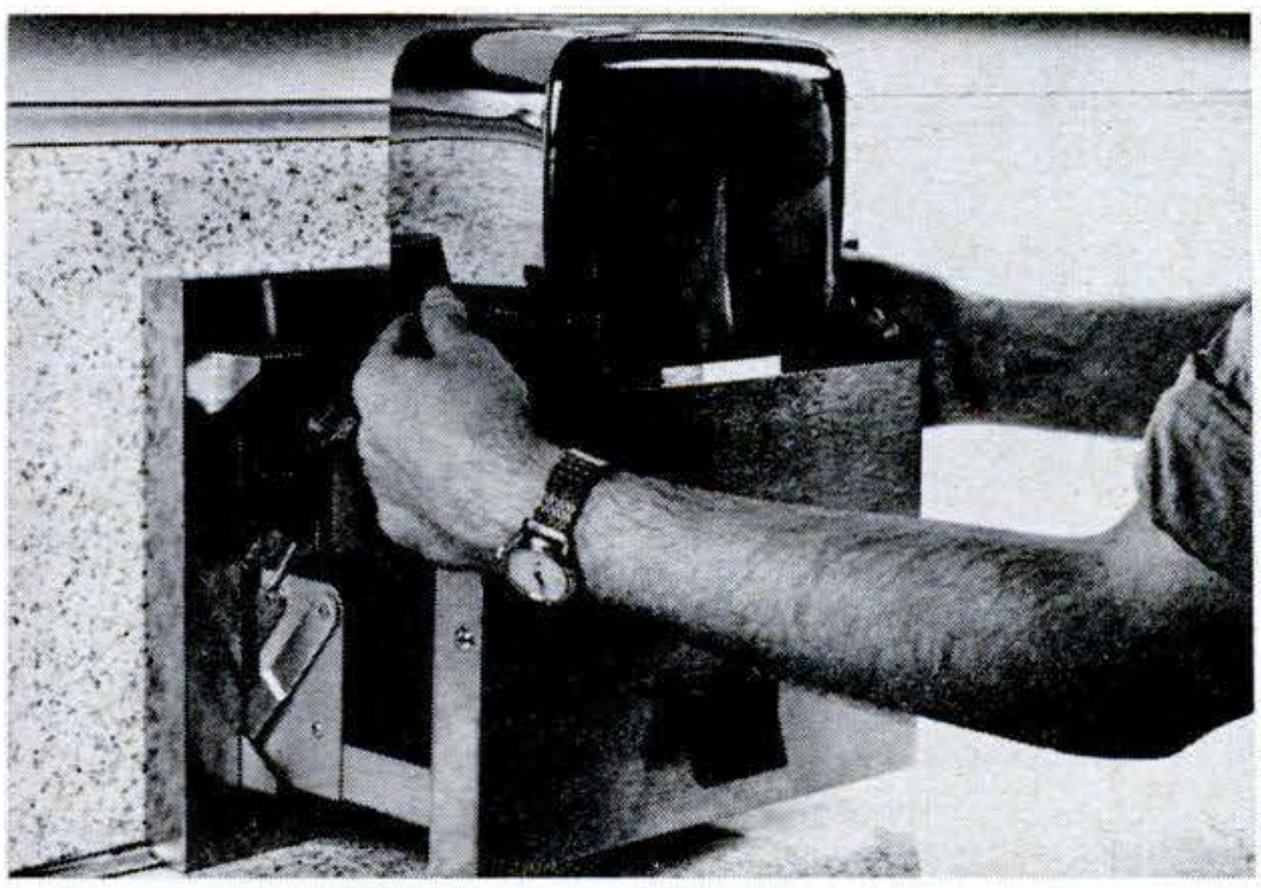
You install it in a hole cut in the wall between studs. You'll need 4⅛″ clearance in the wall. This is what you get with ½″

Copyrighted material

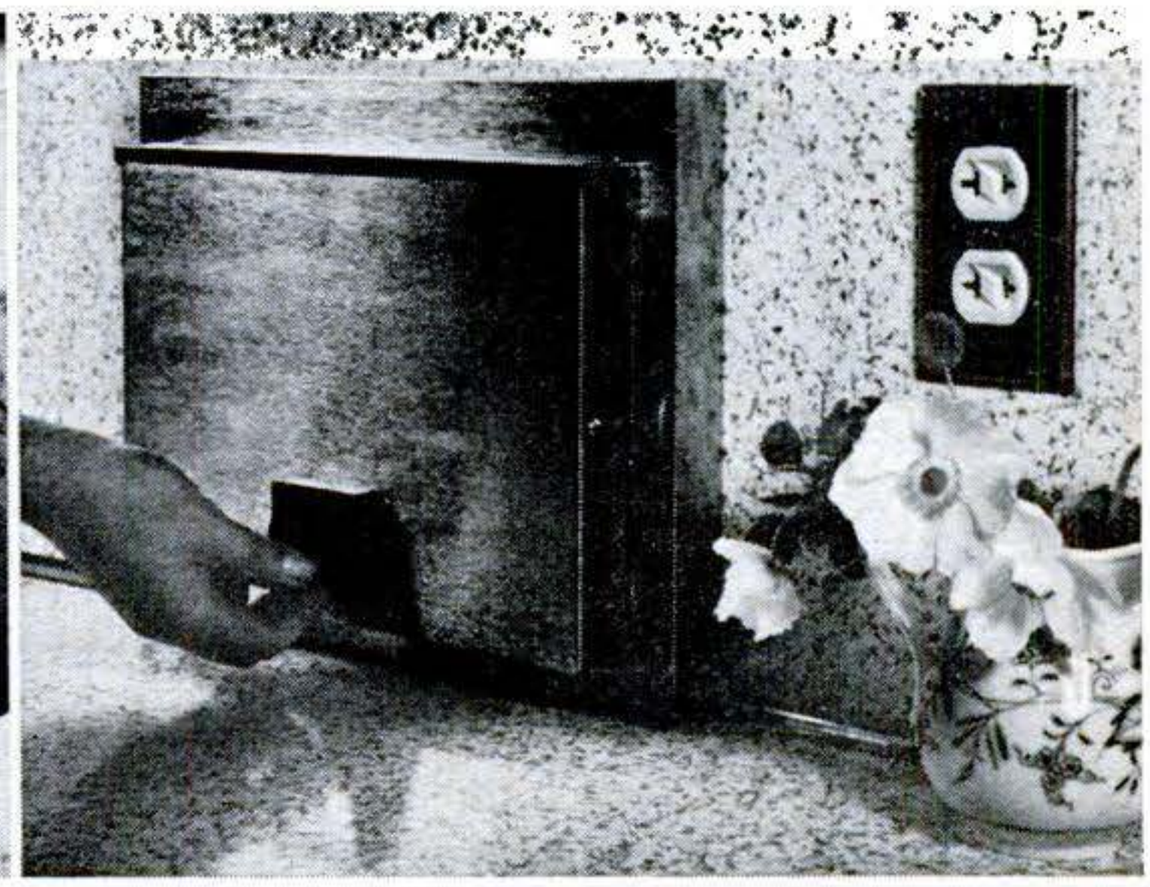




Install it in a rectangular hole cut in the wall between studs with a keyhole saw. Drill holes at corners to start the saw cut. Photo (above, left) shows size to make the hole.



Check to make sure there is enough clearance above the unit to permit lifting the toaster out. Under cabinets, it needs 16″ clear space above the counter.



Fit the front frame of the toaster tight against the wall. Adjust the front panel of the carriage so that it closes squarely. Then . . . toast anyone?

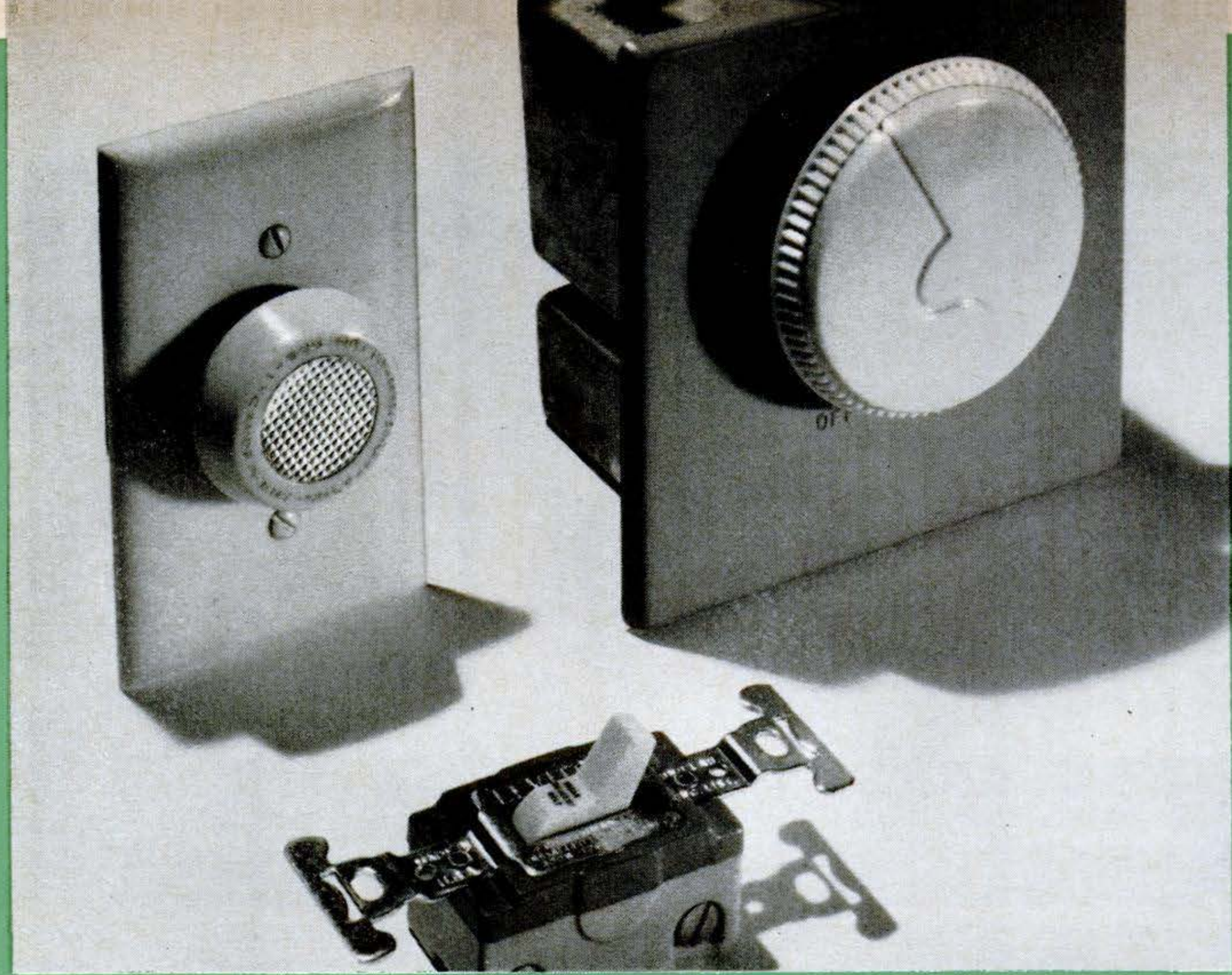
You Build Into a Wall

wallboard over two-by-four studs. You glue blocks to the adjoining studs, and screw the housing to the blocking. The front frame of the housing will cover the rough-cut edges of the hole.

You wire the unit by tap-splicing a length of plastic-sheathed No. 12 cable to a 115-volt outlet box, and snaking it through the wall to the junction box in one corner of the housing. The housing is grounded to the neutral wire.

Available through building-supply dealers and hardware stores, it's made by Leigh Products, Inc., Coopersville, Mich. It's UL approved and comes in a brushed-chrome finish ($44.78) or shaded coppertone ($41.02). The price includes a toaster that fits in the carriage.

Copyrighted material



Three types of dimmer switches: full-range electronic dimmer (left) turns to adjust light level, moves in and out for on, off; autotransformer (right) controls incandescent or fluorescent lamps; two-stage unit (center) switches to full light, dim, or off.

PS Money-Saving Series: IMPROVING

THIS MONTH: How to Install Light Dimmers

By GEORGE DANIELS

When you add dimming controls to your lighting system you get a lot more than extra lighting comfort and convenience. The same dimmer switch that lets you adjust your lighting level from full brilliance to a candle glow also saves you money in two ways.

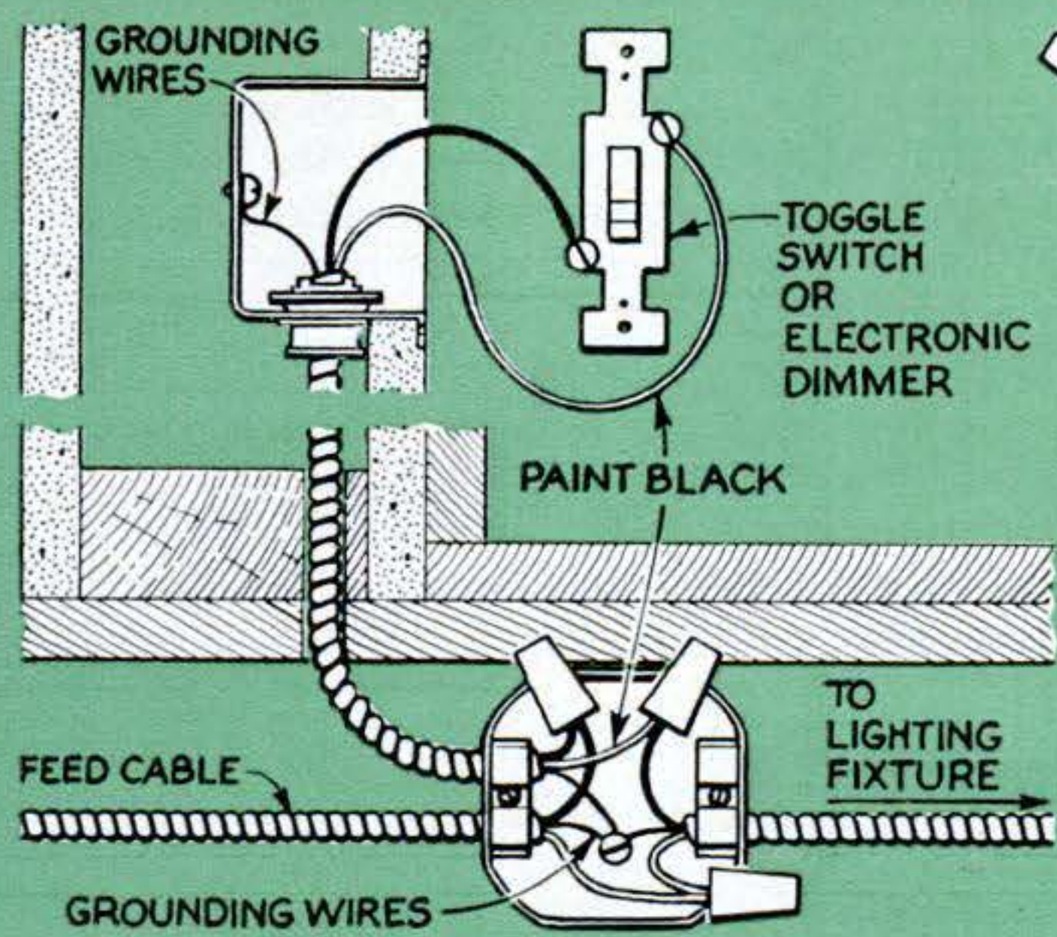
First, it cuts your electric bills. When you adjust your dimmer control down to half voltage your dimmed bulbs consume less than a third of their rated wattage. A 60-watter then takes only about 20 watts, and that's all you pay for—plus less than half a watt required by the dimmer. But that's only the beginning.

At the same half-voltage setting the life of your bulbs is extended 40 to 150 times. That means an ordinary bulb with an operating life of 700 to 1,000 hours (about a month) can burn steadily for four to 15 years. Turn your dimmer switch down still farther to deliver the same output as the old carbon-filament lamps and engineers estimate your bulbs will last 100 years.

There are half-a-dozen basic types of dimmers in sizes from 200 to 1,000 watts. Some simply replace an existing on-off switch, and can be installed in the same wall box in about 10 minutes. Others re-

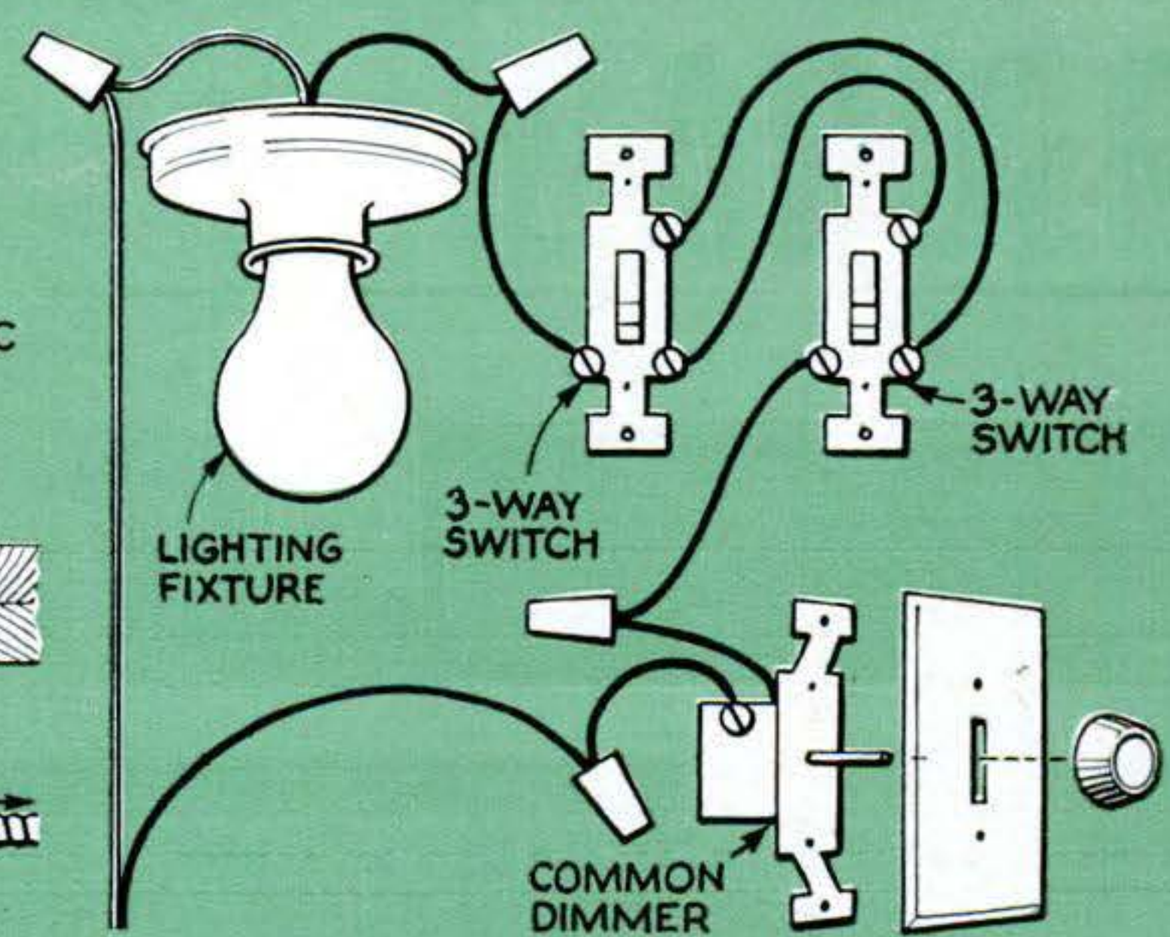
Copyrighted material

This is the simple way—just replace the switch with a dimmer



Electronic dimmer switches can replace ordinary toggle on-off switches without change in the wiring, even in a switch loop as shown. Like a conventional switch, it has only two terminals, and is connected to the black wire in exactly the same way. Be sure its wattage rating is high enough to handle the total lighting load of the fixtures it will control. It fits in the existing switch box. All work, of course, is done with the current turned off at the main switch or by removing the fuse that controls the current on the circuit.

Here's how to use a dimmer with a three-way-switch setup



Where lights switch on and off from two locations, you can replace one of the three-way switches with a three-way dimmer. This has three leads or terminals and connects in the same way as the three-way toggle switch. But the common dimmer switch can be used here also. You put in a new switch box and hook it up as shown. Locate it before the three-way switches or between the switches and the light fixture. The dimmer is always left on, and the conventional switches turn lights on and off at the preset level.

YOUR HOME WIRING

quire added in-the-wall wiring, but solve particular problems. The electronic types are approved by the Underwriters Laboratory only for connection to permanent lighting fixtures, not to outlets.

The reason: If an appliance other than a lamp is inadvertently plugged into the dimmer-controlled outlet it could create a burnout fire hazard. Some new transformer dimmers, however, have been approved for connection to outlets that are to be used only for lamps. If some other appliance is plugged in and overloads the dimmer, it automatically switches off. Superior Electric Co., Bristol, Conn., makes one. Overload protection is built into some electronic dimmers, like Pass & Seymour's (Syracuse, N.Y.), but at present the units have not been okayed for outlet wiring.

You can buy light fixtures with built-in dimmers. Progress Mfg. Co., Philadelphia, sells UL-approved chandeliers with full-range dimmers from $40 to $70. With these, no additional wiring is needed; just wire one into an existing ceiling box.

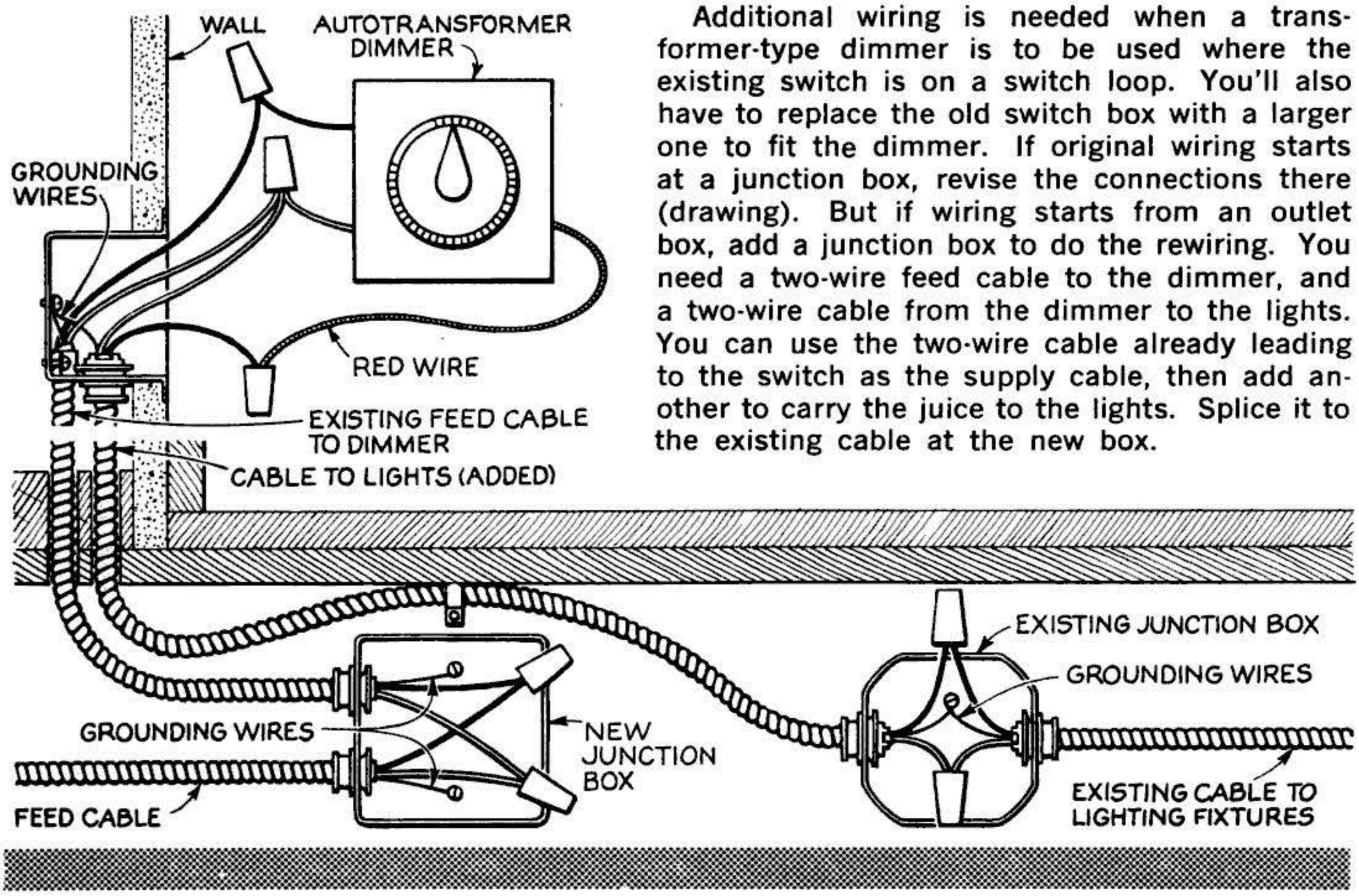
There are also simple wiring arrangements that give dimming effects without a dimmer switch. And, for certain purposes, there are a few tricks that are even easier. The important first step is picking the dimmer system that suits your particular needs and budget best.

The bulb-extender switch is an on-off type that costs around $2.60. It provides dimmed light only, but lengthens bulb life to four years or more. Use it to replace a standard switch to outdoor post lights

Continued

Copyrighted material

Rewiring a switch loop for a transformer-type dimmer



Additional wiring is needed when a transformer-type dimmer is to be used where the existing switch is on a switch loop. You'll also have to replace the old switch box with a larger one to fit the dimmer. If original wiring starts at a junction box, revise the connections there (drawing). But if wiring starts from an outlet box, add a junction box to do the rewiring. You need a two-wire feed cable to the dimmer, and a two-wire cable from the dimmer to the lights. You can use the two-wire cable already leading to the switch as the supply cable, then add another to carry the juice to the lights. Splice it to the existing cable at the new box.

and other fixtures where bulb replacement means work. Use it also for night lights or antiburglar lights when you're away.

The two-stage dimmer costs from $3 up. Its three-position switch provides full light, dimmed light (about 30 percent of full wattage), and off. This is a handy budget type for family rooms where you want full light for reading, and dimmed light for TV viewing. It's good in bedrooms, too, as it lets you turn it on directly to dim to avoid wakening sleepers.

The half-range dimmer averages around $10. Its rotary knob increases voltage smoothly up to 50 percent, then to full in a single step. This is more versatile than the two-stager as it lets you lower light to candle-glow level for night lighting.

The full-range dimmer starts at around $16 and lets you increase the light level smoothly with a rotary knob from zero to full. This is the most versatile of all. It is also available in three-way form for use in a double-switch wiring of the upstairs-downstairs type. But only one of the two existing three-way switches can be replaced with a dimmer, never both.

The rotary knob of the three-way dimmer switch turns to adjust light level, moves in and out to turn on and off. Thus it can be turned off at any preset light level. If the lights are then turned on from the other (conventional) three-way switch, they come on at the preset level.

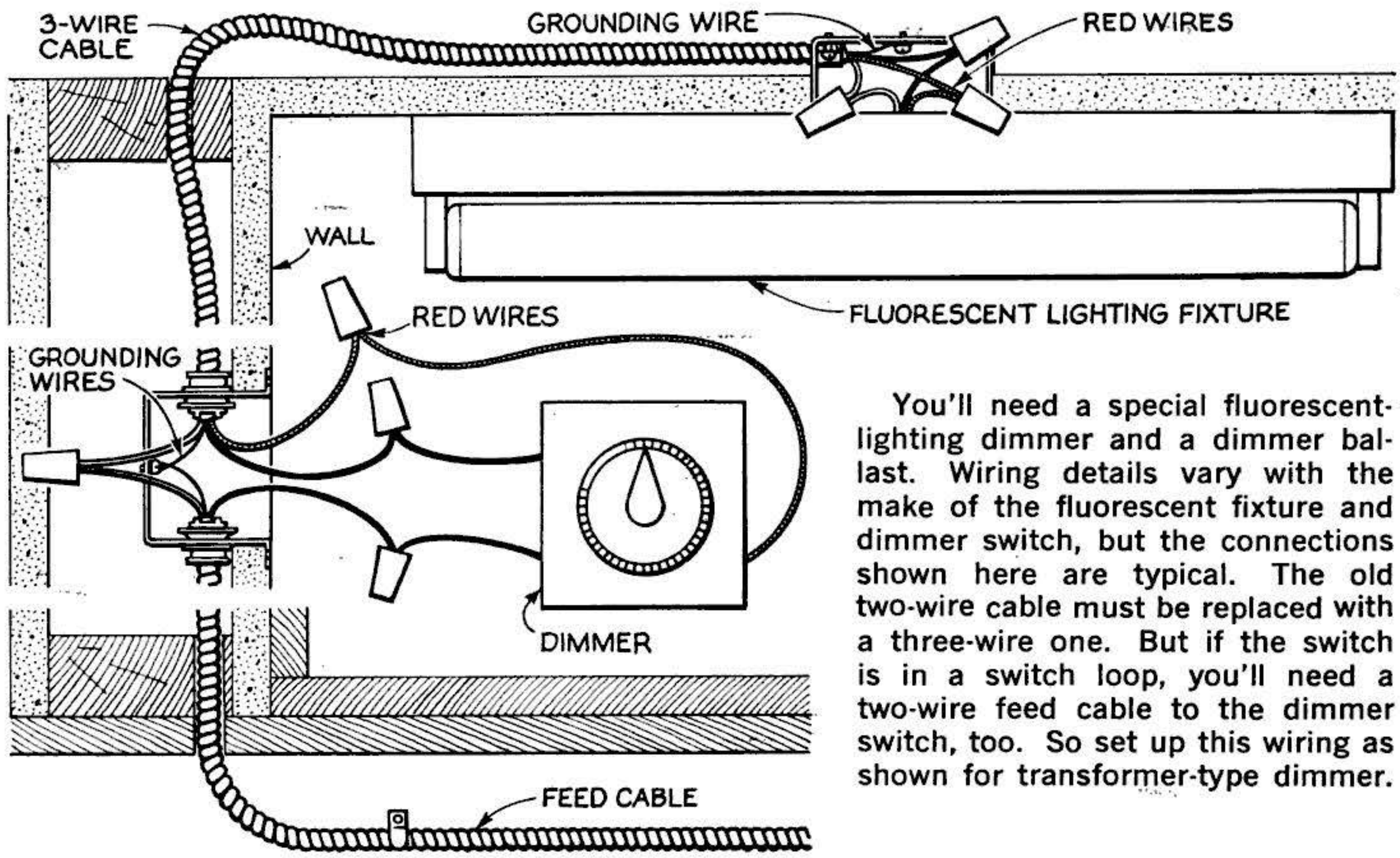
All are made in electronic form with solid-state innards (like transistors). They're so compact that overall size is almost the same as a simple on-off switch. All connect like a regular switch, fit in a standard wall box, and need no additional wiring.

To install any electronic dimmer, just shut off the current at the main switch, remove the existing wall-switch cover plate and the screws that hold the switch in the box. Pull the switch out far enough to make it easy to disconnect the wires from its terminals. Then reconnect the wires to the terminals of the dimmer switch. Screw the dimmer to the box, mount the cover plate, turn on the juice. Some dimmers come with a special cover plate. If you buy a rotary-knob type, you'll find its shaft is spaced to come through the opening in a standard switch plate, so you can use the old one.

The autotransformer dimmer works like a toy-train transformer, but changes power

Copyrighted material

How to connect a dimmer for fluorescent lighting



You'll need a special fluorescent-lighting dimmer and a dimmer ballast. Wiring details vary with the make of the fluorescent fixture and dimmer switch, but the connections shown here are typical. The old two-wire cable must be replaced with a three-wire one. But if the switch is in a switch loop, you'll need a two-wire feed cable to the dimmer switch, too. So set up this wiring as shown for transformer-type dimmer.

smoothly. It's made only in full-range form. Prices start at $16. This type is too big for a standard box, so it comes with one of its own. It won't work in switch-loop arrangements widely used with permanent fixtures, so it's likely to need in-the-wall wiring as shown in a diagram. But it has advantages.

First, it creates no radio or TV interference. Electronic dimmers have built-in filtering to minimize the interference they would otherwise create, but if they are used on the same house-wiring circuit as a radio or TV you may hear a buzz. Also, the transformer isn't likely to be knocked out by voltage surges during thunderstorms if you're in a storm-prone area.

Installing and wiring a transformer dimmer is simplest when the existing switch box is in the run of cable that feeds the lighting fixture to be controlled. In this case, with current off, you remove the existing switch as usual, and then the box. A frameless hacksaw is the best tool for this, as it can be worked in beside the box to cut the bracket that holds it.

After that, the wall hole can be enlarged with the same tool to fit the new box. Get mounting brackets for the new box when you buy the dimmer. These are usually the thin sheet-metal type. Slip them into the wall on each side of the box and bend the tabs over to lock it. Since the cable openings in the box are located at one end only, you may need right-angle connectors for the cable.

If the existing switch was in a switch loop (black wire running from fixture to switch and back) additional in-the-wall wiring is necessary. You still use the original cable, but add one more, connected as shown in a drawing. This is necessary, as power must be fed into the transformer, and from it to the lights.

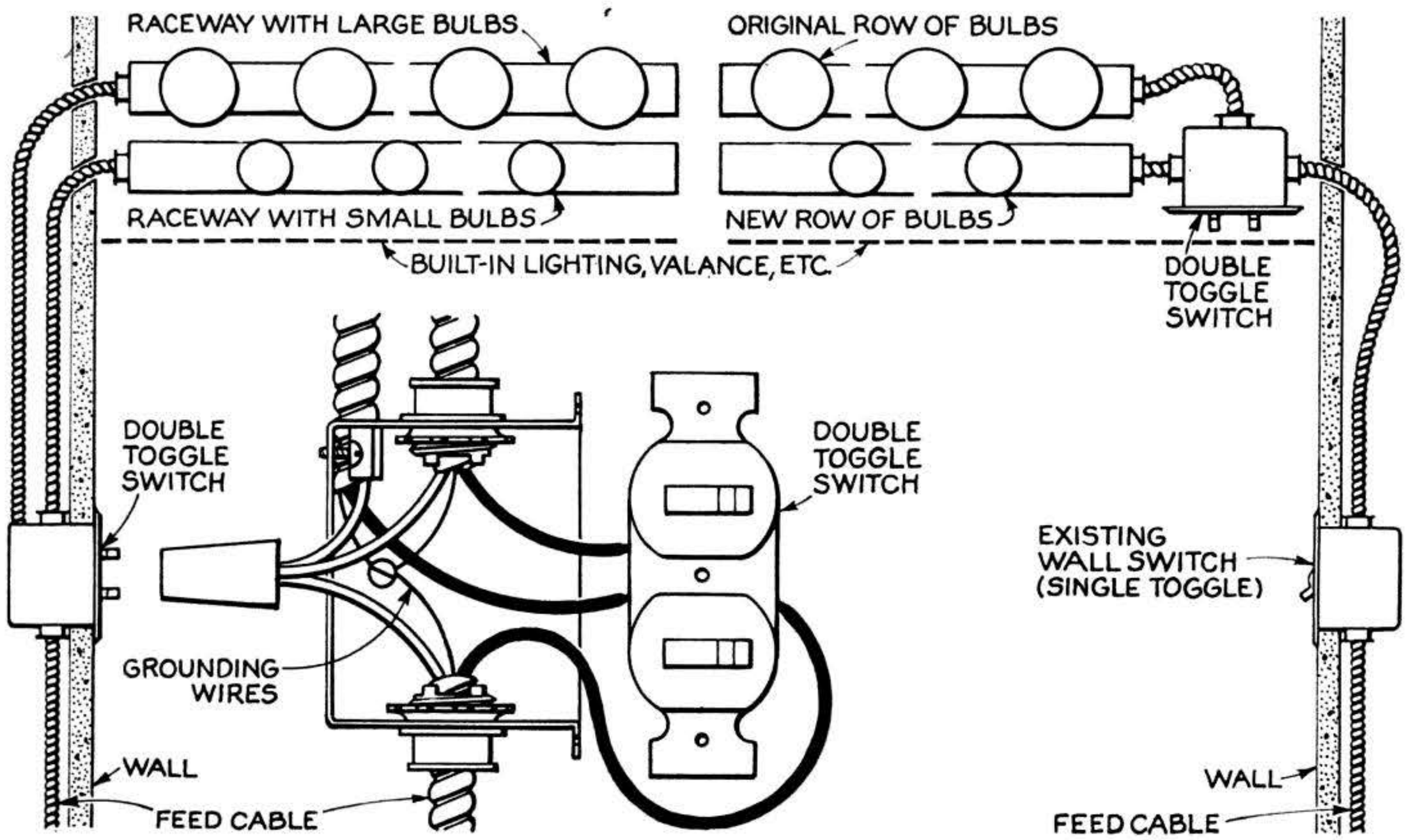
Fluorescent-lighting dimmers come in both electronic and autotransformer types, but require special dimming ballast in the fluorescent fixture. You'll find the overall cost runs considerably higher than bulb-dimming jobs and depends on the number and wattage of the fluorescent lamps. For a 40-watt installation: dimmer switch, $29; 40-watt dimmer-ballasted fluorescent fixture, $18.75. This is about $10 more than with standard ballast.

If you're replacing an existing fluorescent setup to provice for dimming, you'll also have to replace the two-wire cable leading

Continued

Copyrighted material

A simple system for dimming lights without a dimmer



You can get three light levels with two switches. Using conventional wiring hardware as shown, you can have low-level lighting when only the small bulbs are turned on, medium level when only the larger bulbs are on, and high level when both are turned on. In one setup you use a double toggle switch in the old switch box and run another two-wire cable to the valance or cornice lighting, as shown at left. The bulbs should be staggered to let them shine between each other. Wire the lights as at right to avoid in-the-wall wiring work. Existing cable is connected to a double toggle switch in the lighting unit. The wall switch turns the lights on and off, and the new double switch controls the light level.

from the existing switch to the fixture location with a three-wire one. And you'll need a two-wire feed cable to the dimmer switch if it was originally on a switch loop, as shown in diagrams. Your best bet in buying fluorescent dimming equipment: a matched package with all components including dimmer-ballasted fixture. Electrical suppliers stock them.

Dimming doesn't increase fluorescent-lamp life, but maintains the usual operating economy. And dimmed fluorescents have an advantage over dimmed bulbs in that the color of their light changes much less with dimming. Their color is only slightly warmer at dimmed levels where bulb light would be deep yellow or red.

NEXT MONTH: Special-Purpose Outlets and Special Hardware

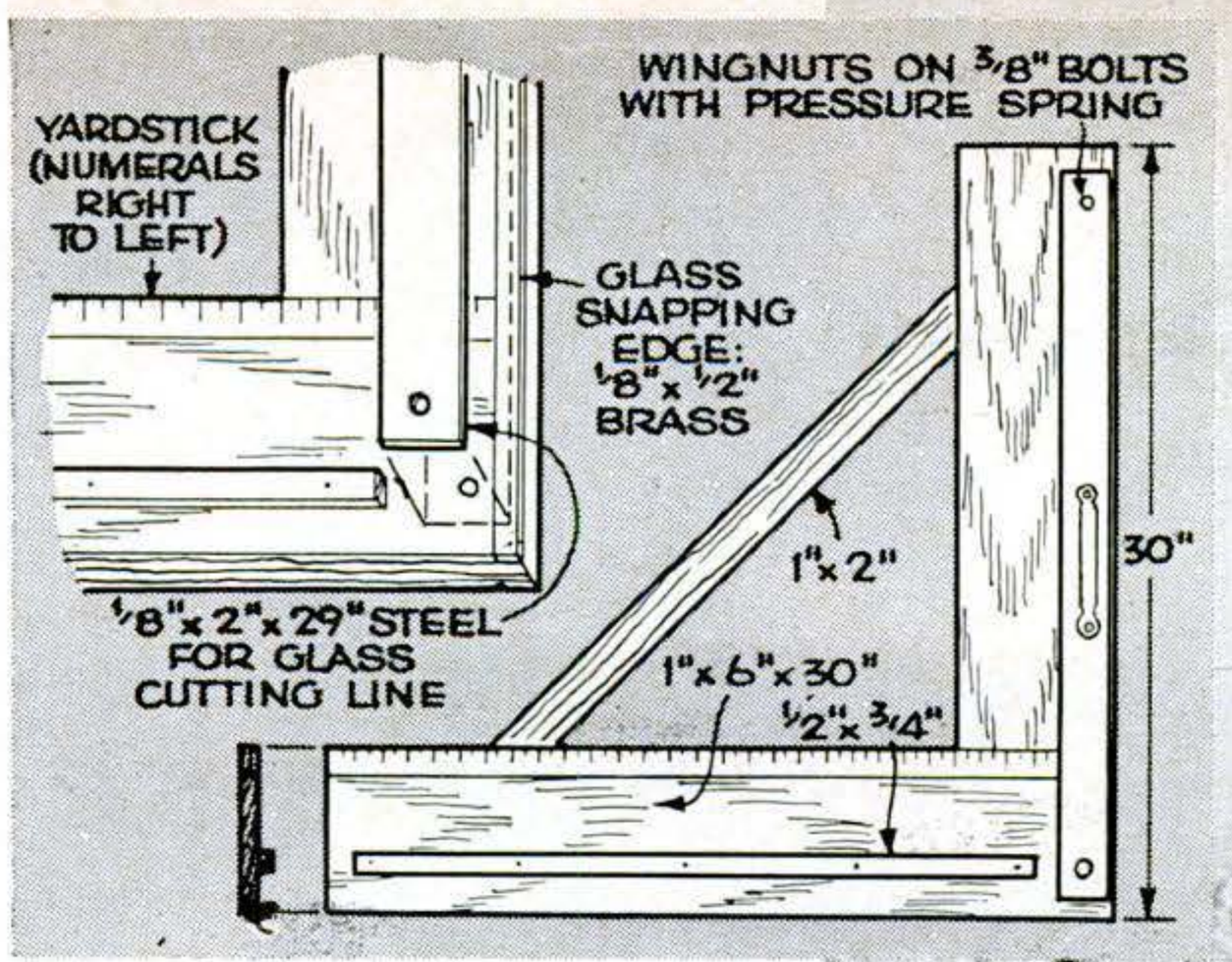
Dimming light without dimmers is possible with several simple wiring arrangements. In built-in lighting, as in a cornice, one of the easiest setups consists of two parallel lengths of multi-outlet raceway like Plugmold 2100 with matching bulb sockets mounted in them. (Use low-wattage bulbs in one run, higher wattage in the other.) These are fed separately by a pair of ordinary toggle switches in a wall switch box. (You can buy a twin-switch unit.)

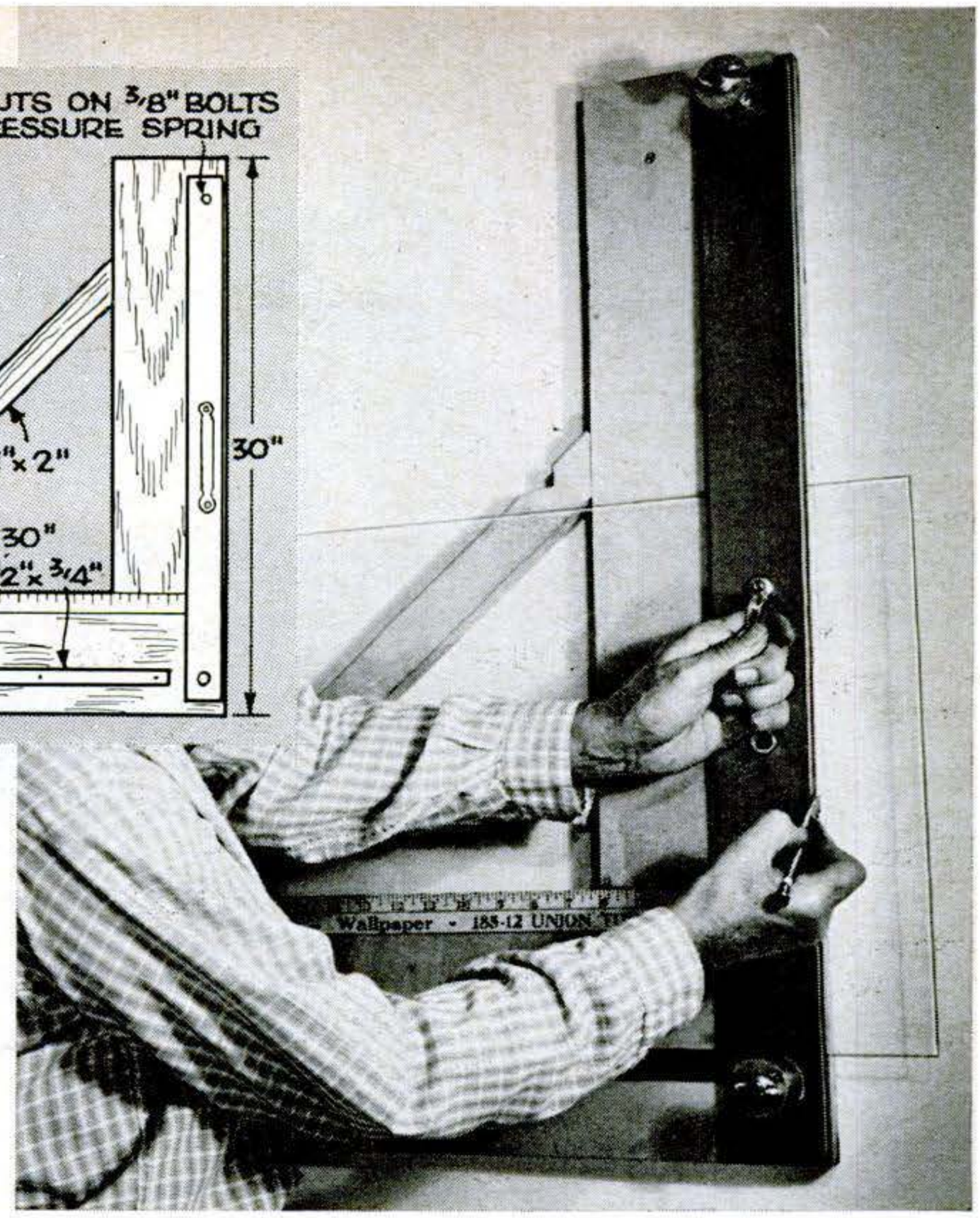
The two switches actually give you three different light levels: Turn on the low wattage for low level; turn it off, and turn on the higher wattage for medium level; turn on both for high. Since the bulbs operate on full voltage for all levels, only the intensity of the light changes, not the color. You don't lengthen bulb life, but you still save money—you don't pay for more light than you need.

Cost of the system varies with the length

[Continued on page 226]

Copyrighted material





Fuss and worry are taken out of glass-cutting with this rack. To use it: Loosen the wingnuts that hold the guide bar under spring pressure, insert the glass under the bar, move the edge over to the dimension needed, tighten the wingnuts, run the cutter along the guide bar, snap off scrap.

Wall Rack for Cutting Glass

Make glass-cutting an easy job. This simple rack does the trick. Mount it on a basement or garage wall where it is out of the way, yet handy when you need it. You just slip in a piece of glass, zip down with the glass cutter, and snap off the waste end.

A built-in ruler shows you the size, a steel plate holds the glass and guides the cutter, and a brass strip is the snapping edge. Build it large enough to cut glass of any size you're likely to need around the house. The one shown takes glass up to 24″ wide and of any length.

First, join the two pieces of one-by-six at right angles. Use good flat stock without knots. Join the pieces with dowels, or attach a metal plate on the back with plenty of screws. Reinforce with a diagonal brace across the two arms.

The outside vertical edge is routed to receive a strip of brass, fastened with countersunk flathead screws.

For the ruler, use a yardstick that has the numerals reading from right to left. Chisel a groove to set the ruler in flush. Hold a glass cutter along the guide plate, and position the ruler so that its end just touches the near side of the wheel of the cutter. Fasten the ruler with screws.

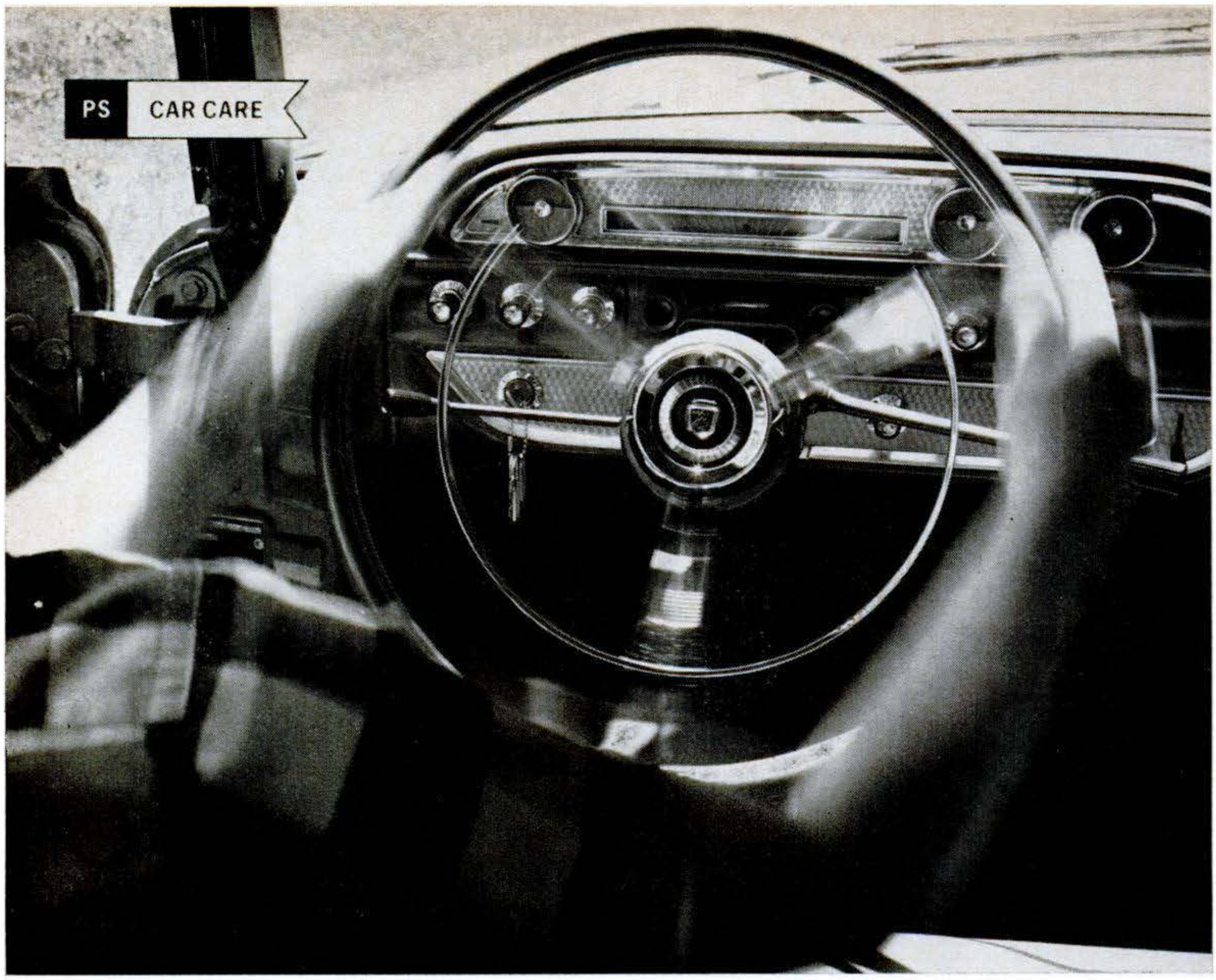
Make the rest bar from a strip of scrap. Attach it 2″ above the bottom edge with screws. Make sure it's exactly square with the vertical cutting edge.

Drill a hole near each end of the steel guide plate. Position it on the frame so the cutter wheel runs just inside the edge of the brass strip. Then drill matching holes in the wood upright. Insert lag bolts from the back, and recess the bolt heads to keep them from turning. Drill and tap two holes in the guide plate to mount a screen-door handle.

Cement a thin sheet of rubber to the bottom side of the guide plate. Place the plate over the bolts, put springs over each bolt, top them off with washers, and run a wingnut onto each bolt.

RALPH TREVES, Jamaica, N.Y.

Copyrighted material



Say "bunk" if someone tells you a little play in the steering wheel is okay. But don't be scared

WHEEL-ALIGNMENT BUNK

New discoveries and recent changes in front suspensions have exploded old theories about aligning wheels

By RICHARD DAY
PHOTOS BY RUSS DOUGLAS

If you know what is bunk and what is fact about wheel alignment, you stand to save money and have a safer, better-handling automobile.

Ball-joint suspension, softer springs, smaller wheels, wider tire sections, and low-profile tires have knocked down some of the revered old concepts that make up a good part of what people believe about wheel alignment.

One of the most plausible-sounding bits of bunk centers around tire wear. An axiom of correct wheel alignment is that tires wear smoothly, and square across the tread. You would think that once a car had got its wheels aligned, tires with abnormal wear would then begin to wear properly and that the uneven wear should soon disappear. Not so. In spite of the alignment, an abnormal wear pattern, once established, will continue until the tires wear out. One solution is to put the sick tires on the rear before having an alignment and bring the rear tires up front. Or you may have to buy new tires for the front.

Continued

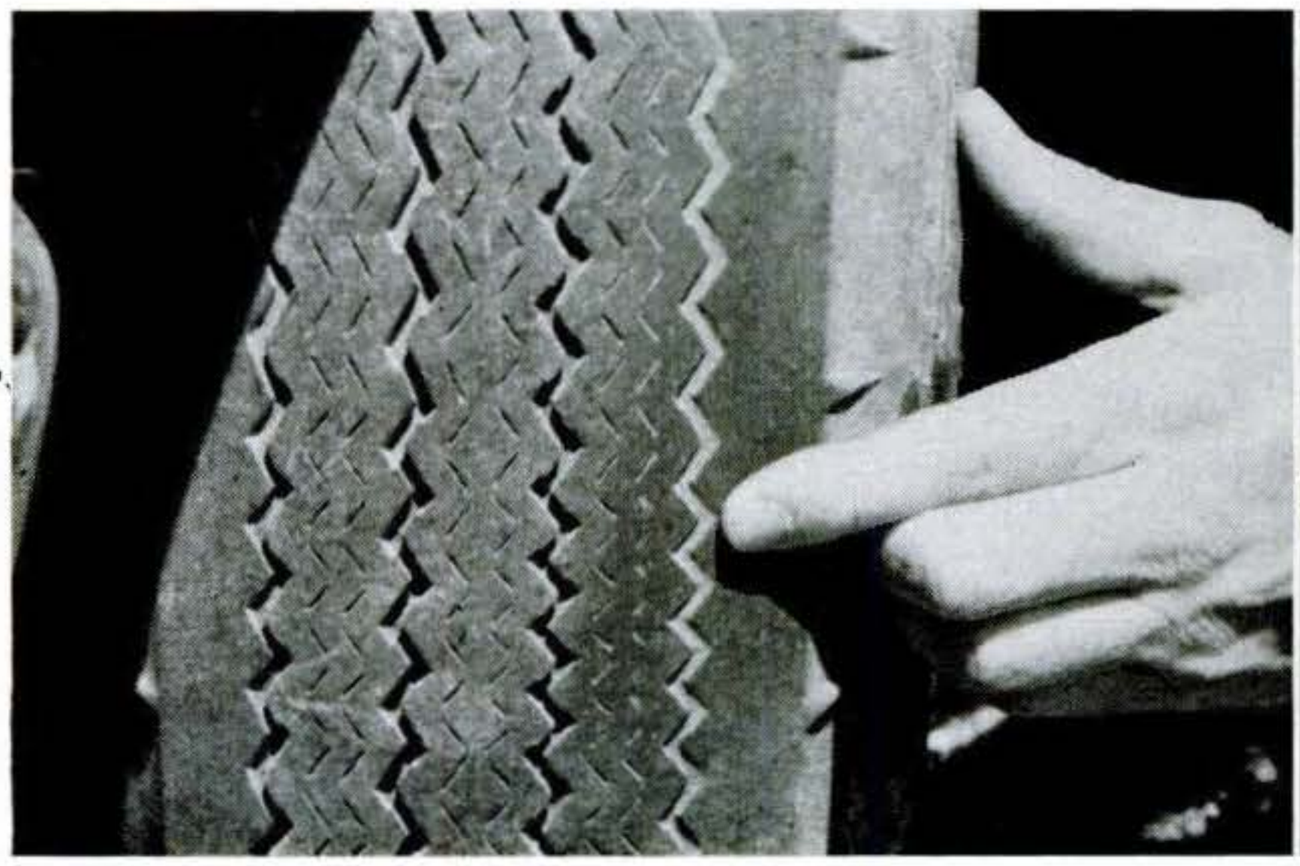
Copyrighted material

if you find up to ¼-inch in-and-out play at the bottom of your front wheel—it's normal.

...are you wasting money up front?

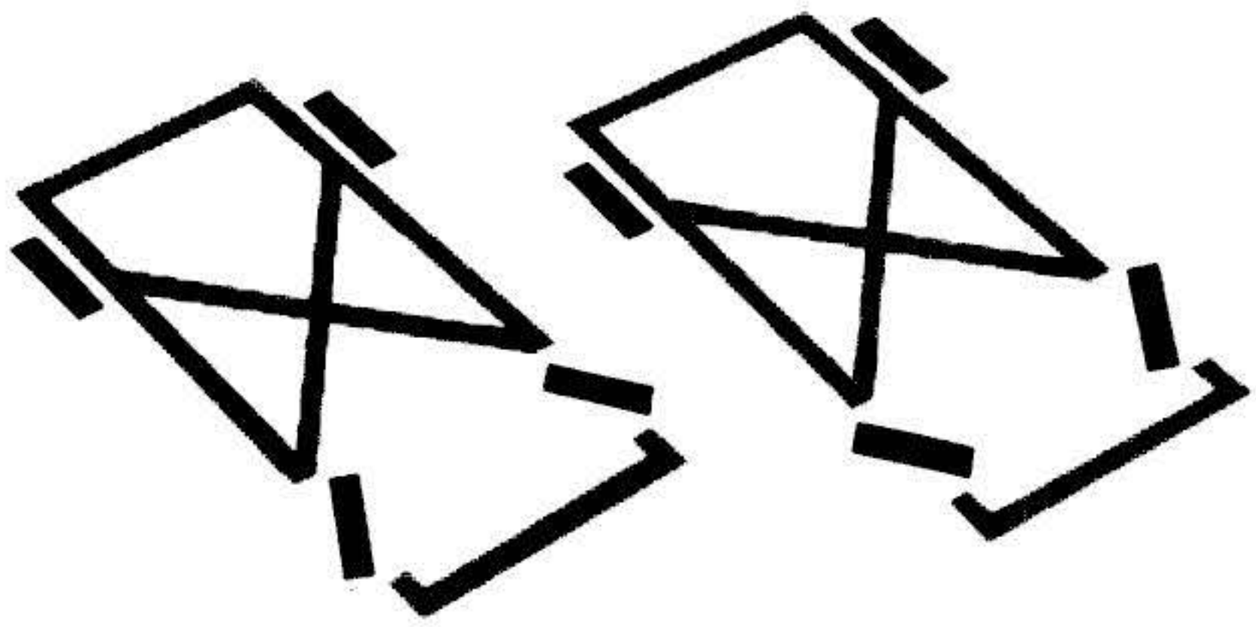
Too much camber has worn the outside edge of this tire tread more than the rest. After having wheels realigned, you might think this tire would begin to wear correctly. It won't. Put it on the rear.

Feel your front tires for toe wear. If the worn ridges fight back as your hand moves out over the tread, suspect too much toe-in. If the ridges resist on the in-stroke, suspect excess toe-out.



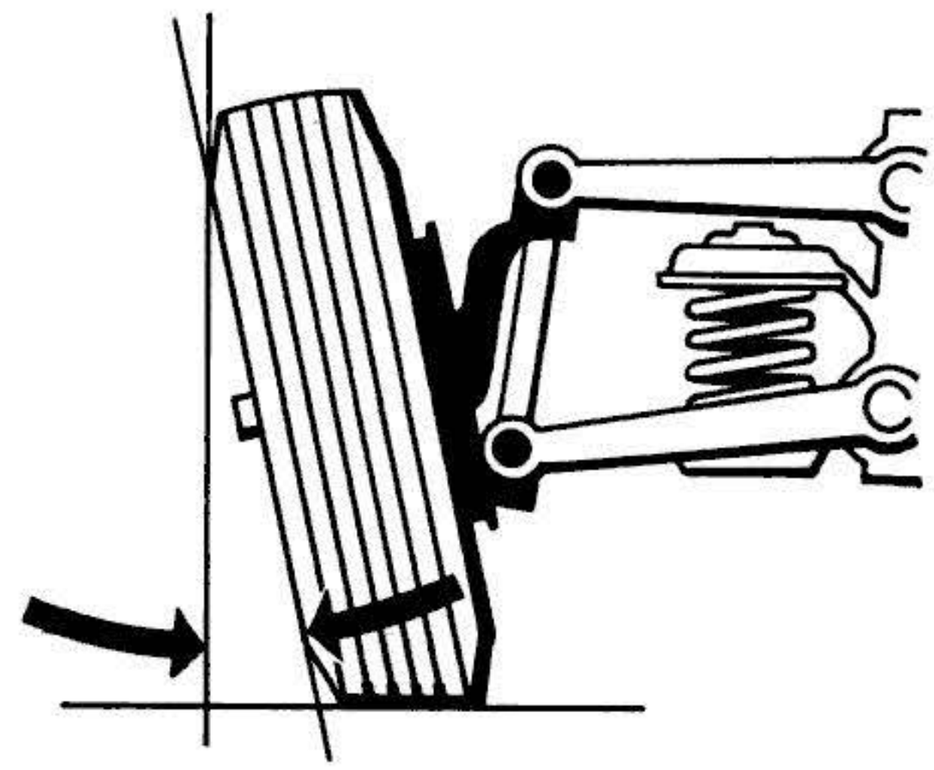
Copyrighted material

This is toe-out and toe-in



Toe-in is a necessary evil. A small toe-in angle is used to counteract a tendency in the wheels to toe out at speed. When the car starts rolling forward, the pavement and wind forces try to push the wheels to the rear. The suspension system keeps the wheels where they are, but wear in the suspension and steering parts develops into many sources of minute play, which combine to give the wheels some freedom to turn out at speed. Tires wear out just as fast if the wheels are set with too much toe-in as without toe-in.

This is camber angle



Camber is the wheel tilt from vertical when viewed from the front. Camber is *positive* when the wheels tilt out at the top; *negative* when they tilt in at the top. The function of a small positive camber angle is to place the point of load under the tire-contact area, distribute the load on the wheel bearings, ease the steering, and reduce tire scrub. Too much or too little leads to uneven tire wear, hard steering, increased wear on ball joints and wheel bearings. Correct settings give vertical wheels when the car is loaded and in motion.

There's another common misconception that you can only tell when an auto's wheels need aligning with alignment equipment. The truth is that you can usually tell by tire wear. An expert can go further and tell by tire wear in just what way and how much out of line they are.

How to spot misalignment. To make your own diagnosis, look at the front treads. If there is feather-edging of the tread, excess toe-in or toe-out is grinding thousands of miles off the life of your tires. You can tell excess toe-in by passing your hand outward over the tread. When the tread seems to "fight back" on the *out* stroke, your wheels are toeing *in* too much. When it resists on the *in* stroke, there is too much toe-*out*.

The big problem is that by the time you notice any tread wear, it's too late to save the tread already scraped off. This can easily cost more than an alignment job. For that reason it is best to have regular wheel alignments.

How often should you have your wheels aligned? Here's where more wheel-alignment bunk makes car owners wait too long and waste money. In the days of straight-front-axle cars you could get a wheel alignment and, barring an accident, it would last for years. Not so today. The best you can hope to get out of an alignment on a modern car is a year. Six months is more normal.

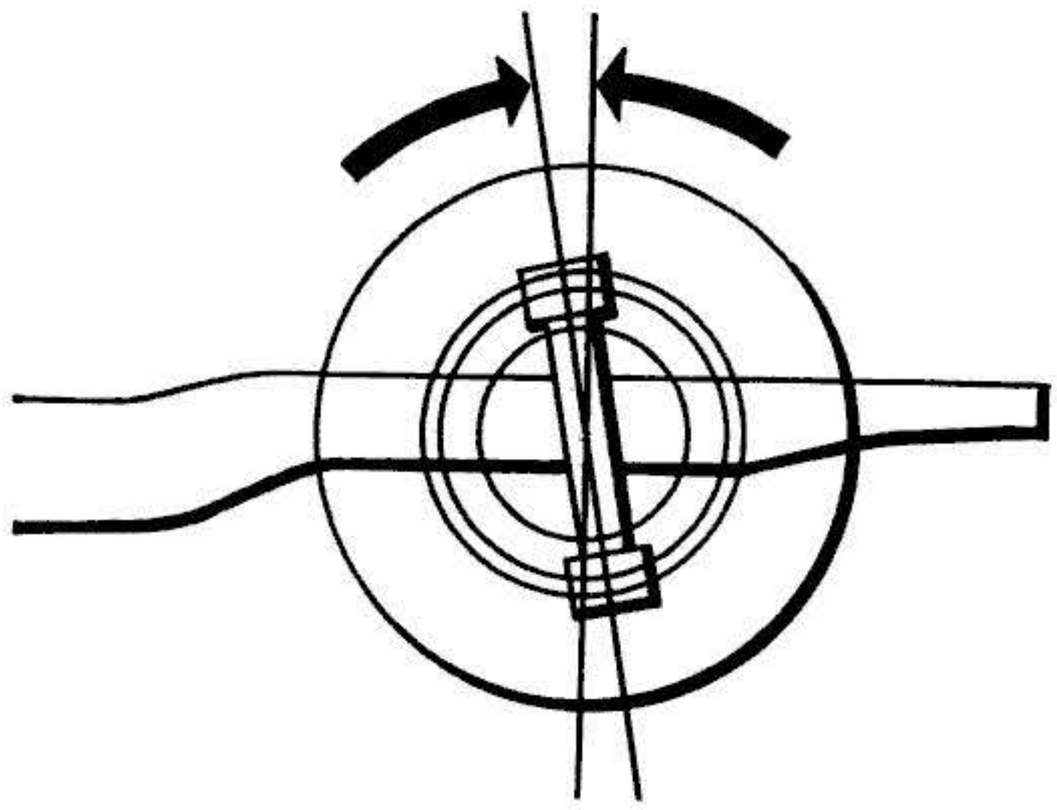
Built-in looseness. If car makers were to eliminate all looseness and build front ends hair-splittingly accurate, costs would go up to the point where you wouldn't pay for it. It's much cheaper to take account of looseness in the alignment specifications. This is what the car makers do.

All of which brings up more wheel-alignment bunk. This thing about looseness. A mechanic can jack up the front wheels of almost any modern car with a year or more of driving under its fenders and wiggle the front wheels in and out at the bottom. A chiseler can scare you, telling you that your wheels are dangerously loose and need new ball joints.

Unless the in-and-out play is more than the ¼ inch most manufacturers specify, tell

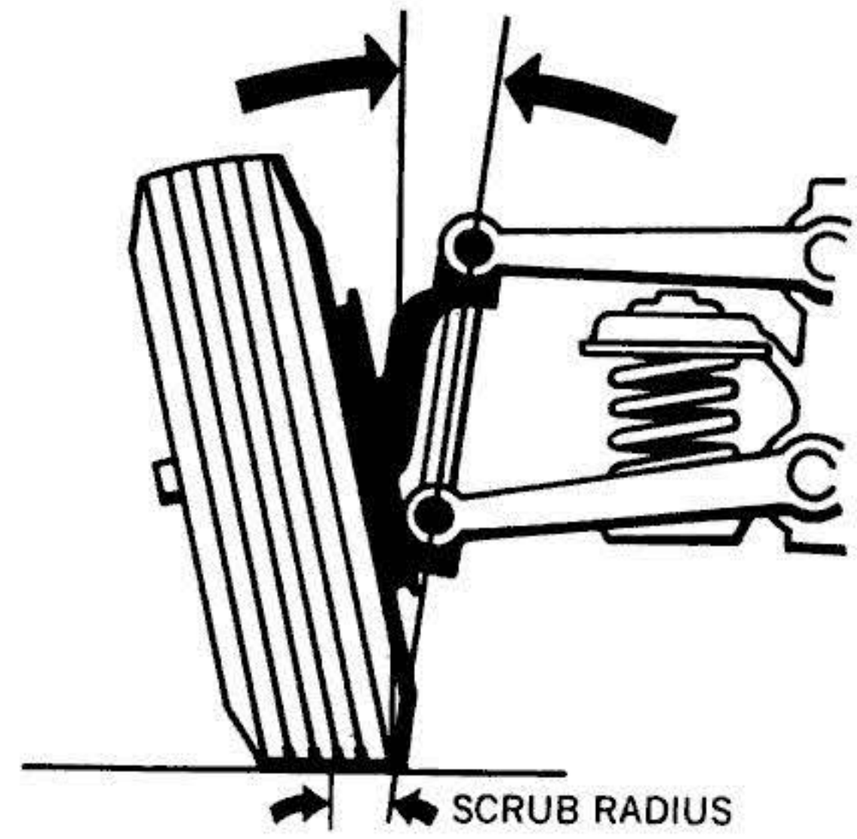
Copyrighted material

This is caster angle



Caster is the angle between spindle-support arm and a vertical line, viewed from the side. Drawing shows *positive* caster—more and more cars specify *negative* caster. This reduces directional stability but offers easier steering, improves parking ease, minimizes road shock. Positive caster tends to keep the front wheels straight, helps straighten them out after a turn. Too much positive caster leads to hard steering, sensitivity to road shock, low-speed wavering, poor cornering. Increased scrub radius (right) is needed.

Steering-axis inclination



Once called kingpin inclination, this angle is integral in the knuckle design. It is used to control scrub radius, which is the distance (at ground level) between the steering axis and the center of the tire-contact area. The correct scrub radius combines directional stability with ease of turning at low speed, reduces tire scrub, and eliminates the need for excessive camber. Too long a scrub radius means hard steering; too short leads to wandering and weaving. If not identical on both sides, car pulls to side of least inclination.

him "bunk!" The lower ball joint in front of most suspensions is designed to wear or "give" to the point at which the wheel has ¼ inch of play before it needs replacement. If this were not the case, you might need new ball joints with each oil change. When the car's weight rests on the ball joints, the play disappears. Unless the manufacturer specifies it, there should be no play in the upper ball joint. There should be no end play in the tie-rod connections either.

Play in the steering wheel? Speaking of play, a majority of drivers believe that a little play in the steering wheel is okay. Once true, this has gone the way of other wheel-alignment bunk. The car that once did well to keep between the fence posts now must travel wheel-to-wheel with other cars at highway speeds. If there is any steering-wheel play nowadays, the driver is not in full control of his vehicle. Actually there is no need for play because steering-gear adjustments provide for every type of normal wear. When the steering wheel moves, the wheels should turn.

Another popular misconception: Rear wheels don't need aligning. They do. Rear-wheel alignment is quite common, report busy alignment shops. Rear tires as well as front ones should be inspected by the mechanic for a typical feather-edged toe-wear pattern and a one-sided camber-wear pattern.

The current rash of rear-wheel-alignment problems is brought about by high-powered engines commanded by heavy-footed drivers, heavily loaded station wagons, heavy trailers, and wide-track design.

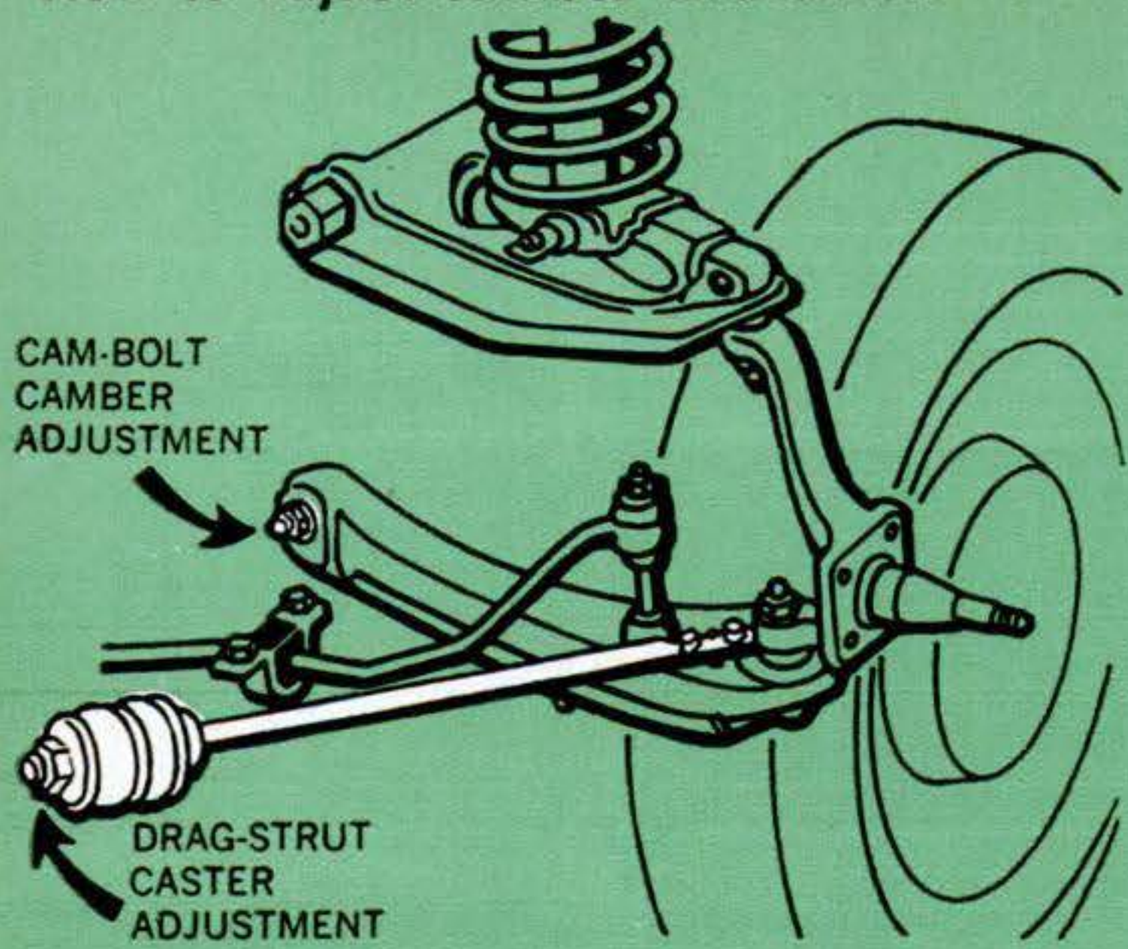
Two different alignment-equipment representatives told me that when Pontiac came out with wide-track design, the company merely added some six inches in length to its standard axle housings of the year before. The increased length was apparently too much to enable the unbeefed-up housings to stand any more than normal use. Alignment shops are reportedly doing a booming business in wide-track Pontiac rear-wheel alignments.

One mechanic I talked to says these axles bend so easily that straightening them is

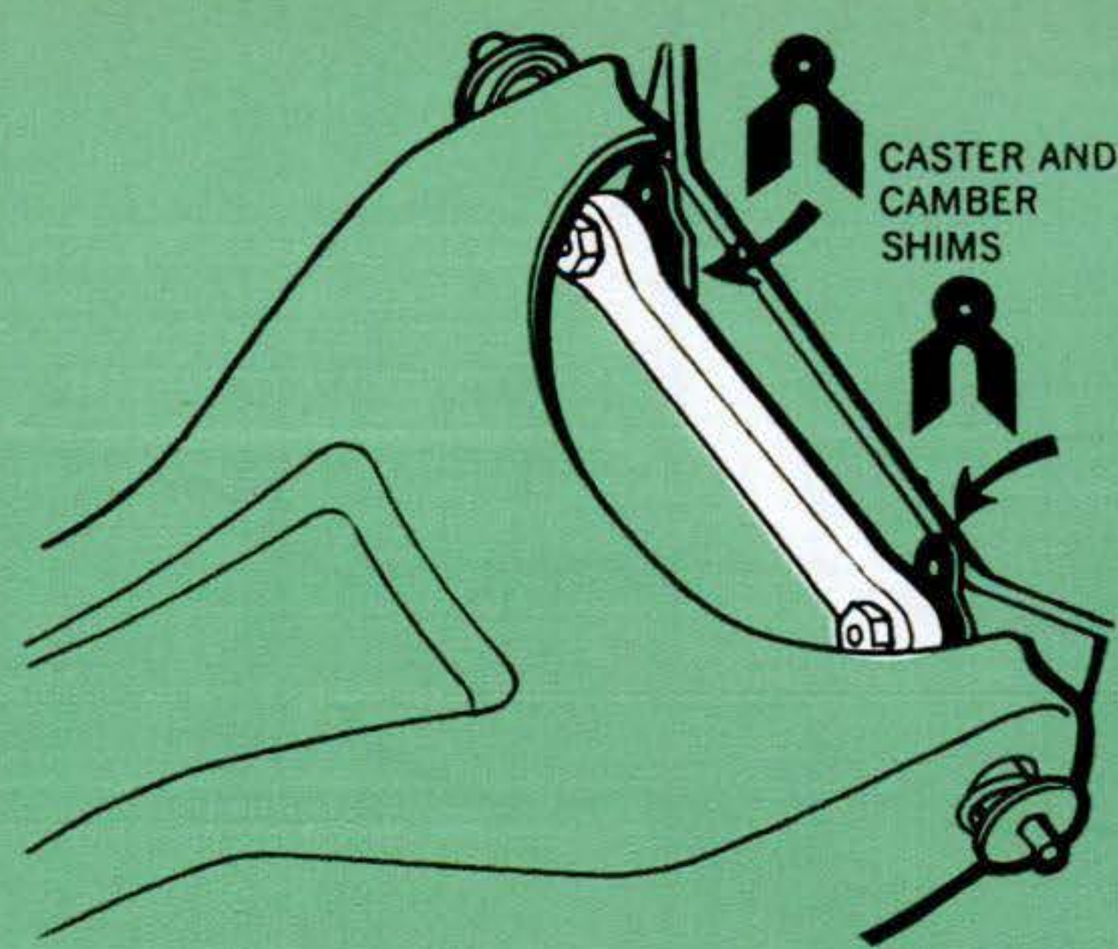
Continued

Copyrighted material

How to adjust camber and caster



On some cars, notably Ford and Mercury, camber is adjusted by a cam bolt working on the inner pivot of the lower control arm. Caster is adjusted by turning a nut at front end of drag strut.



Shims are used to adjust caster and camber on most GM cars. Placed between the frame and the pivot shaft for the upper control arm, they dictate the position of the upper ball-joint socket.

no problem. However, he recommends to his customers that, after correction, struts be installed to ensure that the axles stay straight.

You may hear one alignment-shop operator say that the equipment he uses does a better job than that used by some other shop. This is pure bunk. Even the manufacturers of alignment equipment won't claim this. All equipment is accurate.

About tolerances. All auto manufacturers' wheel-alignment specifications for their products have built-in tolerances. The too-common belief among mechanics is that these tolerances are there for the benefit of the mechanic doing the alignment—so he will have leeway in the accuracy of his work. Don't fall for this bunk. The tolerances are there for *your* benefit. They let the mechanic who knows what he's doing adjust each setting, within tolerances, to the type of driving that you do.

If you complain of hard turning, the mechanic can set caster to the least-positive or most-negative tolerance. If you do lots of highway driving and want all the stability you can get, the mechanic can increase caster toward the more positive end of the tolerance to call on more of its stabilizing influence. Within closer limits, camber can be adjusted to your driving, too. Toe-in, however, is so closely tied to tire wear that its specifications have little tolerance. Toe-out on turns and steering-axis inclination are both fixed angles and, unless parts get bent, they stay put.

If an auto service salesman ever tries to tell you that a wheel alignment can be performed without an alignment rack on the shop floor, make him show you that his floor is level within close tolerances. When being aligned, a ⅛-inch difference in height between one front wheel and the other throws the camber of each wheel off ⅛ degree. A ¼-inch difference in height influences camber enough to affect the handling of a car. Likewise, a one-inch front-to-rear height difference of the alignment site will throw the caster off one degree.

Car load is important. Leveling extends to the car chassis itself. Tires must be equal in size from side to side and at their proper pressures. You should remove unusual loads, such as toolboxes, from the car during alignment. If your car is to be driven on a long trip fully loaded, you should present it with full load to the alignment shop before the trip. Then, upon your return from the trip, the wheels should be realigned without the added weight. Most motorists could get a better alignment, and consequently better handling and longer tire life, merely by seeing to these details.

One wheel-alignment question has yet to be resolved. It may never be. While car makers all issue alignment specifications for

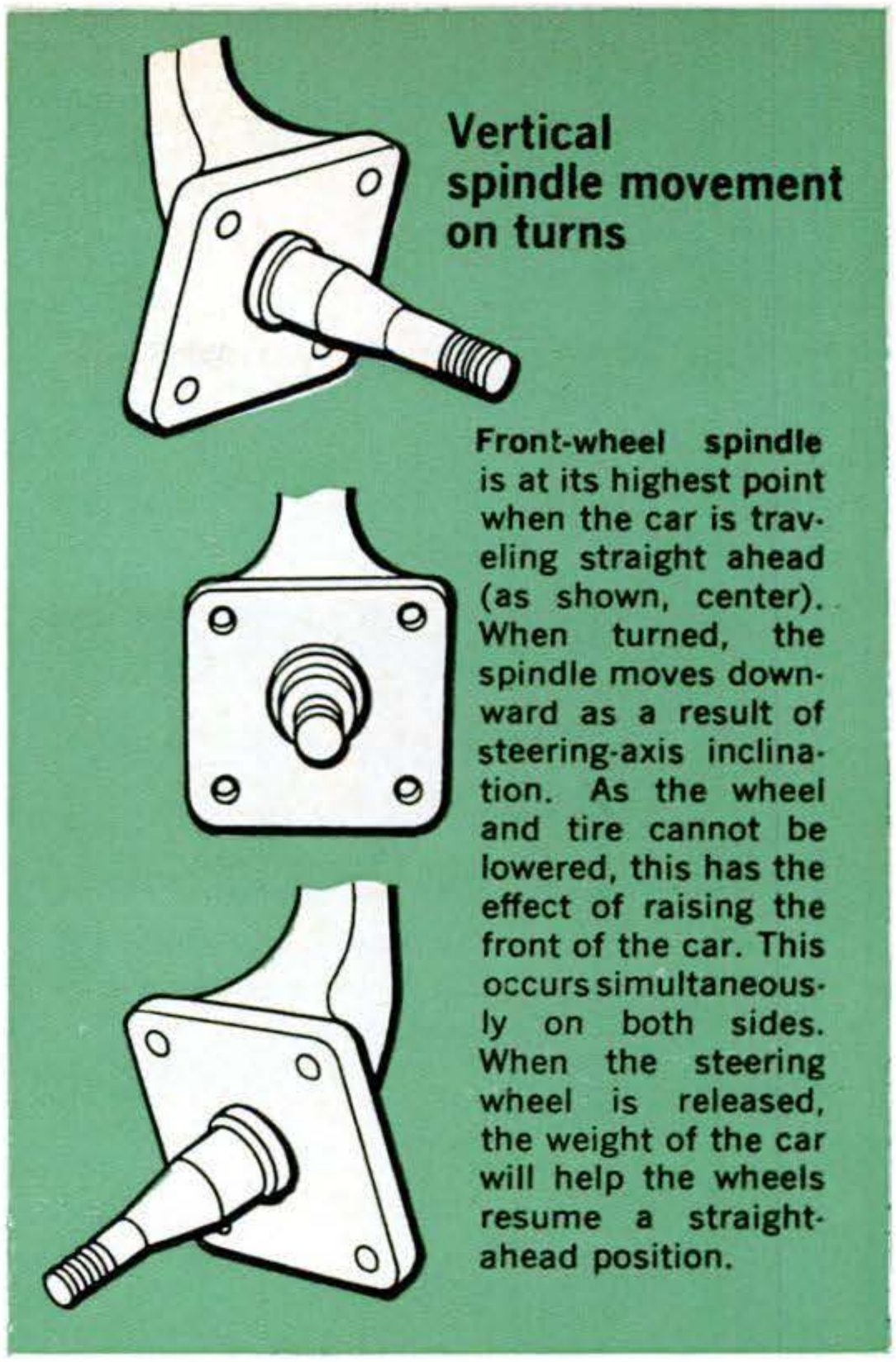
Copyrighted material

their products, all wheel-alignment mechanics do not follow them. Instead, some use different specifications published by at least one wheel-alignment-equipment firm for use with its instruments. These specs prescribe ¼ and ½ degree more camber for the left front wheel than the right. The equipment people claim their figures lead to better handling and more stable cars, with less tire wear—the goal of all wheel alignment. The breakaway from auto makers' specs came when a trucking firm discovered that slightly more camber in the left front wheel than the right would noticeably increase right front tire life.

They're still experimenting. It was natural to apply these findings to cars, and, as a result, the equipment manufacturer first published his own specifications for 1964 cars. Other makers of alignment equipment are said to be experimenting with revised specs. Some of these call for equal camber, side to side, and unequal caster. However, all of these are still within current tolerances set by the auto manufacturers.

Still other equipment makers point out that the auto manufacturers spend a great deal of time and money in engineering and testing their products, and it is presumptuous for anyone else to set himself up as a higher authority.

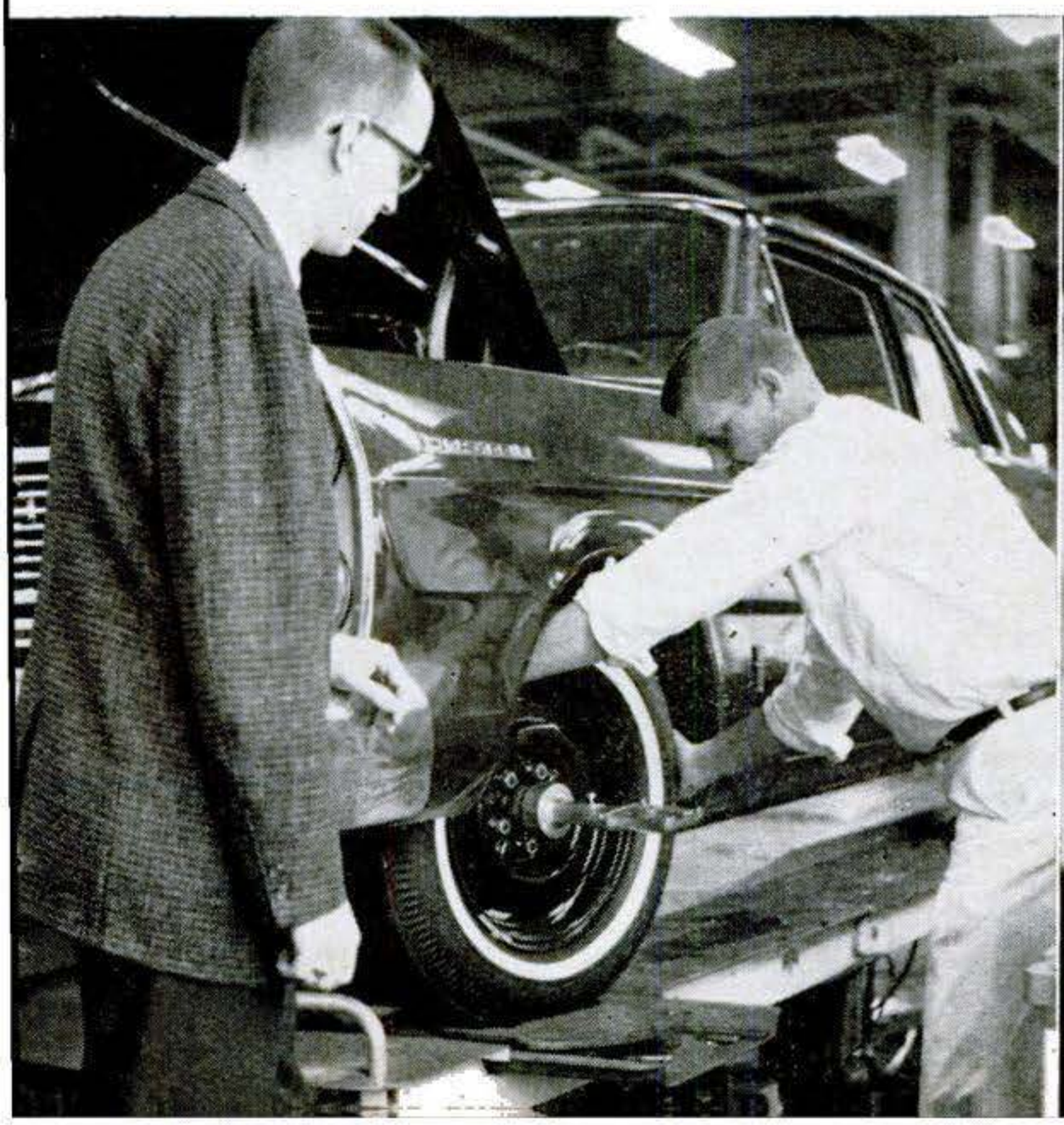
The auto makers, some of whom have revised their specs to call for unequal camber on their 1965 models, generally look askance at the independent specifications.

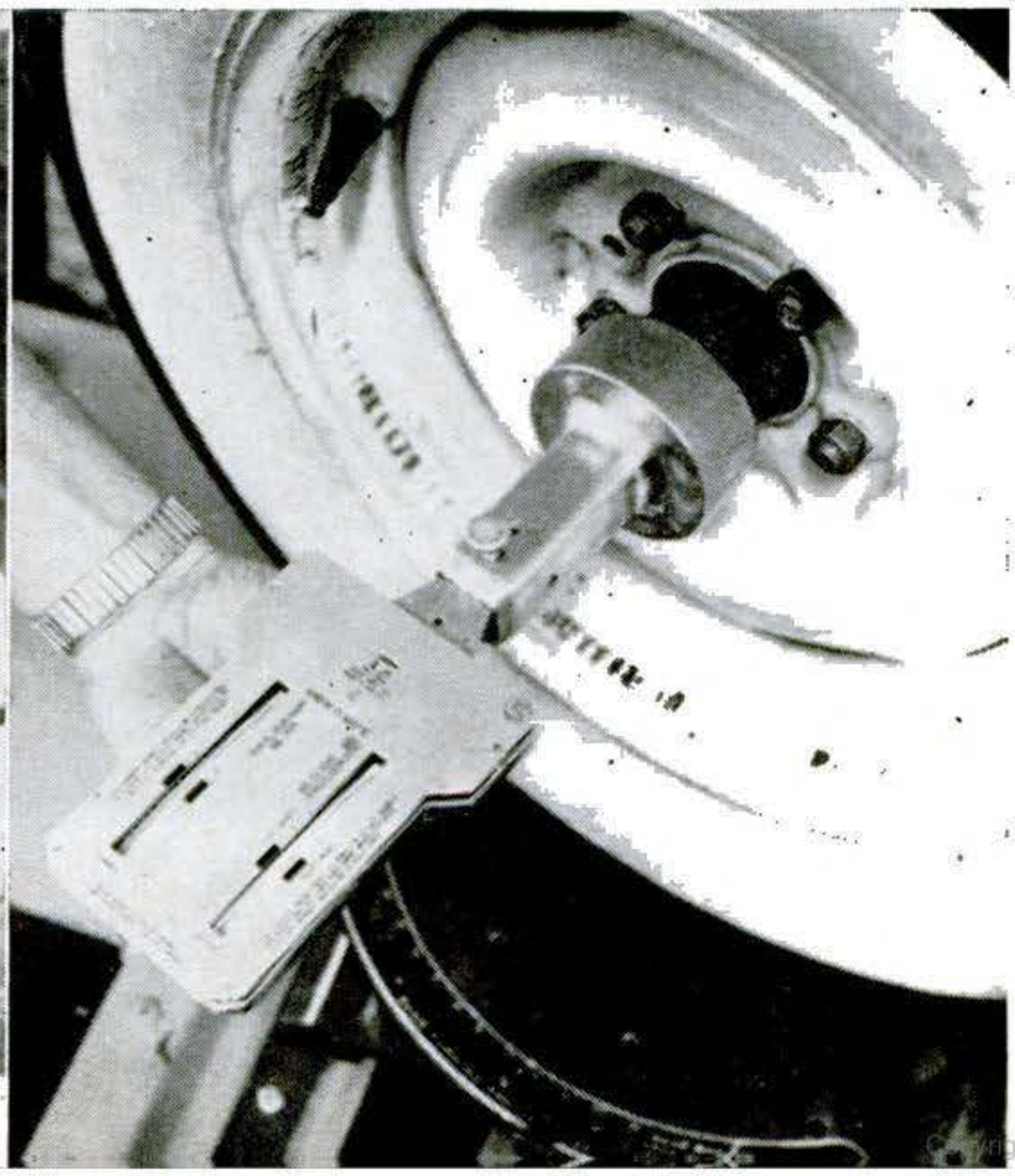


They urge owners to bring their cars to an authorized dealer for service. The battle continues, with neither side giving in. It may someday resolve itself into truth and bunk.

In the meantime, you should have your wheels aligned regularly twice a year. PS

Say "bunk" if an auto serviceman tells you a level floor is good enough for an alignment job. As little as a ⅛-inch difference in height between one wheel and the other will throw the camber off ⅛ degree on each wheel of your car. And ¼-inch difference is enough to affect the road handling of the car. Similarly, one-inch front-to-rear difference will throw the caster angle off by one degree.





Copyrighted material

"You're an incompetent fool who shouldn't be in business," bellowed Kirk. "And when I get through telling what a mess you made of this car, you won't be."

Gus Saves a Friend from a Snow Job

By MARTIN BUNN

New snow—the third this year—lay thick on the ground as Gus Wilson walked to the door of the Model Garage that morning. He was glad to see that Stan Hicks had cleared it off around the pumps and the shop door.

"Better put a recharged booster on the truck," Gus told his helper. "Temperature dipped last night. There'll be calls."

The first came before Gus got his coat off. He let Stan take it, and was busy installing a rebuilt generator when a '62 Olds drove up. Gus raised the door.

He had never seen the car before, but the young man driving it was Steve Polcheck. Gus had known Steve as a motor-hungry teen-ager, watched him go through a series of love affairs with hot rods and jalopies to become a competent mechanic. Gus was pleased when, following his Army service, Steve opened a little garage of his own in a nearby town.

But the young man's blue eyes were troubled as he got out of the car.

"Hi," called Gus. "How's business?"

"Not bad. The shoestring I started on breaks once in a while," said Polcheck, brushing a hand through sandy hair, "but till now I've managed."

Gus got out his pipe and packed it. "With that new Computer Industries branch near you, you'll soon have all the work you can handle."

"Yeah," returned Polcheck glumly. "The big question is, can I handle it?"

"Sure you can. If it's money . . ."

"It's not money. It's me," blurted Polcheck. "And this blasted car. And Mr. Everett Kirk, blast him."

Gus lit his pipe. "Better tell it."

Polcheck leaned against a wall as Gus

Copyrighted material

The terrible-tempered Mr. Kirk threatened to run Steve Polcheck out of business if Steve didn't fix that mysterious oil leak. Paging Gus Wilson!

hitched himself up on a workbench.

"I've had jobs from people at CI since it opened. Business was so good I even had a part-timer washing parts, scraping off gaskets, cleaning up. A good kid.

"Then this guy Kirk drove in for a full overhaul, taking care to explain it's only his second car—as if he wouldn't trust me with a good one. He's an electronics engineer at CI, and pretty important. I'd have sworn I did a good job, even cleaned up the engine. Kirk seemed satisfied. But yesterday he drove in again, boiling mad. There was oil all over the top of the engine."

Gus tapped out his pipe. "You made sure the breather cap was clean, the road-draft tube underneath not kinked or plugged?"

"I sure did. Then I took off the valve covers to see if the oil-return holes were clear, though I'd checked them when I did the job. They were okay, too. I buttoned up everything, cleaned the engine again, put in a free quart of oil—and apologized.'

"Good public relations," remarked Gus. "But you hadn't found the trouble."

Polcheck's neck reddened. "I'll say not! This morning he was back, really teed off. The engine was all oily again. He swore if I didn't fix the trouble he'd tell everybody at CI what a lousy mechanic I am. He will, too. It could bust me."

Gus put his pipe away. "Let's look at that engine."

Polcheck opened the hood and grinned wryly. "I cleaned it again, hoping the leak would show on the way here. But look!"

The engine was as clean as a new skillet. If there were positive crankcase ventilation on this model, mused Gus, the metering valve would be suspect. But PCV had come a bit later. Steve had checked the road-draft tube, but it was still possible . . .

Continued

Copyrighted material

"I went over the exhaust system to make sure there's no back pressure," Polcheck put in. "It's clear. Got any of that fluorescent powder for tracing leaks?"

Gus nodded, went to the supply locker, and got a small can and a black fluorescent lamp. While Polcheck put a little powder in the oil-filler tube, Gus hooked up the lamp and doused nearby lights.

Polcheck started the engine. In the purplish glow of the ultraviolet lamp the two men watched it. A minute went by. Then a small luminous green spot appeared at the edge of a valve cover, slowly growing.

"That's got it!" exulted Polcheck.

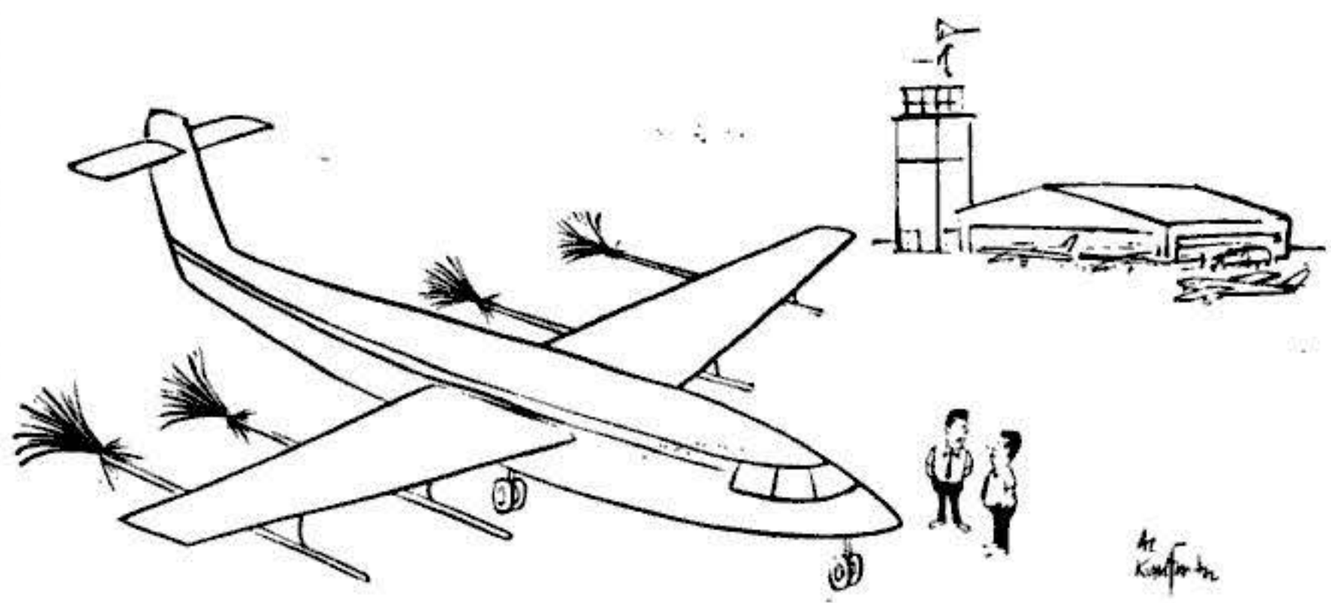
"Hardly seems enough of a leak to spray the engine as you said," demurred Gus.

"It may be worse when the engine's cold," muttered Steve. "Expansion and contraction of the metal. You think so, Gus?"

Gus grunted. "Your helper may have left a bit of the old gasket stuck on where it's oozing. But you should have spotted it."

"Guess I rushed too much, Gus. Thanks a million for saving my neck."

"I'm not so sure I did," returned Gus.



"I hear the patent is held by some witch."

Late that afternoon a big sedan with California plates rolled in, trailing blue smoke. Gus detected a clatter of hydraulic valve lifters and a skip in the engine.

At the wheel was an elderly woman. She got out spryly, gave her tweed coat a tug, and looked up at Gus severely from a height a foot less than his own.

"Are you Gus Wilson? Like to be sure I've got the right party," she said.

"I am. What can I do for you, ma'am?"

"Mrs. Mabel Murphy. My car just limps along. Doesn't start right off as it used to, either. It ran fine all the way from Pasadena. It's got to take me back there come April, so I want it fixed."

The smell of the exhaust, reeking of oil, hung heavy in the air even though she had shut off the engine. Taking a cue from it, Gus removed the spark plugs. All eight were badly oil fouled.

"The engine's burning oil, Mrs. Murphy."

"Well, shouldn't it?" she demanded.

"No, ma'am, only gas. When oil burns in the cylinders, it dirties the spark plugs and makes the engine miss—limp, I mean. And start hard, too. I can clean the plugs, but they won't stay clean."

She pursed her lips. "Well! Go ahead."

The plugs were reasonably new and, when cleaned, fired satisfactorily under test. Gus put them back and started the engine. It ran without miss, but the blue smoke threatened to fill the shop.

"That smoke is a sign of oil burning," explained Gus, shutting it off. "Subject to some tests, it seems you need a ring job."

The lady waved a gloved hand. "Because it smokes? That's just from the stuff I put in for those noisy valves —the little cans you pour into the gas tank."

"Upper-cylinder oil? You're using that for noisy valve lifters?" asked Gus.

"Whatever they are, it seems to quiet them some. I used to buy a can for each tank of gas. I even put some cans in myself."

"How many cans, ma'am?"

"They were selling five for the price of two at the discount store," said Mrs. Murphy triumphantly. "I put them all in, of course. If one is good, five must be better; and I got them cheap."

Gus bit his tongue to keep from chuckling. "Guess you don't need a ring job after all, Mrs. Murphy. Your car's burning that top oil, not engine oil. Five cans was too much, and it fouled the plugs."

"Oh my! I did goof, didn't I?"

"Don't worry. Each time you get gas, it dilutes the oil—but don't add any more. And better get your plugs cleaned again before you start back to Pasadena."

It snowed again that night. The next day, the phone was ringing as Gus got in.

"This is Mabel Murphy," said the caller.

Continued

Copyrighted material

Certain parts of Ford Motor Company cars are engineered to tolerances 100 times thinner than this page.

So fine a piece of machinery can be cared for best by the specialist–your Ford or Lincoln-Mercury dealer.

See him and be sure.

Your dealer has special equipment, such as this "Rotunda" oscilloscope engine analyzer, for the care of Ford-built cars.

QUALITY CAR CARE

Only at Ford and Lincoln-Mercury dealers

Ford

Copyrighted material

"My son's car won't start. Would you please come out to Crescent Village?"

Gus drove out to a new home in a development housing many CI people. In the driveway was a '64 Comet.

"Good morning," said Mrs. Murphy. "My son's gone off in my car. He was already late because of shoveling the driveway."

"Guess that's a problem you don't have in California," remarked Gus.

"Hmph! If I lived here, I'd have me a sloping driveway like that one," she said, pointing across the street.

"Why?" asked Gus, getting his tools.

"Well, that man doesn't *shovel* snow. He just backs his car downhill through it. I saw him do it again this morning."

"That's one way," said Gus.

He checked the Comet's starting circuit, tightened a battery clamp, and with a booster got the engine running.

Driving out, Gus glanced at the house across the street. A new Olds stood in the big garage, but deep tracks showed another car had backed out. The name on the roadside mailbox was Everett J. Kirk. Gus headed for Polcheck's garage.

The young mechanic, frankly surprised to see Gus, raised both eyebrows.

"I'm still wondering about that oil-leak trouble," explained Gus.

"There *was* some of the old gasket left on," Polcheck said. "It must be okay, or Kirk would have been here by now."

Then a horn blared. As Steve opened the door, the '62 Olds swept in and a short, red-faced man with wire-brush gray hair stepped out.

"Look at it!" he roared.

Steve hurriedly raised the hood.

"I don't get it," he said at sight of the oil-spattered engine. "It checked out."

"I'll check you out!" bellowed Kirk. "You're an incompetent fool who shouldn't be in business. And when I get through telling what a mess you made of this car, you won't be—not around here."

Gus could keep quiet no longer.

"Steve hates to tell the customer he's wrong," he said. "But whether he likes it or not, I will. That leak is your own fault."

"Oh, it is! My car never spit oil before!"

"That's right—not until we had our first heavy snow, right after Steve finished that overhaul," returned Gus. "That was when you bulled your way out of your uncleared driveway, right through the drifts.

"Then, and twice later, snow packed into the breather tube under the car. The plugged tube made pressure build up in the crankcase until oil blew out the filler cap. By the time you'd spotted it and driven here to blame Steve, the snow melted out and there was nothing to find."

"My wife does it with our new car, and that has no oil leak," protested Kirk.

"Because it has positive crankcase ventilation. It has no road-draft tube to get clogged," explained Gus.

"You sure of this?" Kirk asked Steve.

"Absolutely," said Polcheck. "But I'll clean the engine one last time free."

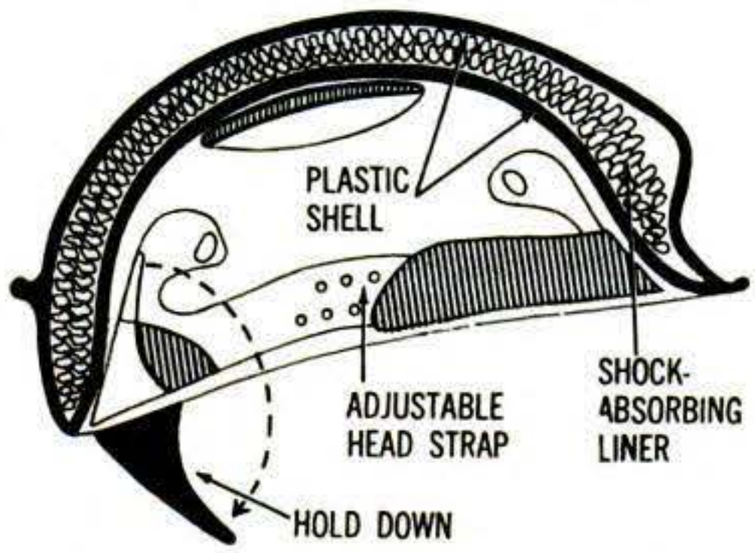
"I thought I was dead when I saw that oily engine again!" Steve said to Gus when Kirk had driven out.

"You caught on fast," chuckled Gus.

Polcheck shook his head in amazement. "How did *you* know all that, Gus? Who tipped you off?"

Gus hesitated. "You'll never believe it. It was a little old lady from Pasadena." PS

Style in safety helmet makes hard hat look like soft fedora



Cutaway drawing of new stylish Buco helmet shows energy-absorbing liner sandwiched between inner and outer shells of light, rigid plastic.

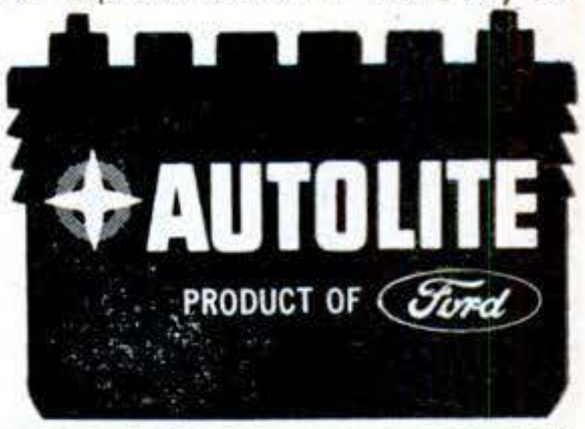
Now they're making hard hats to look like those worn for ordinary street wear. The man at left has on a safety helmet styled to look like a soft fedora. New styling follows extensive research and testing by Wayne State University, Detroit. Other styles from Joseph Buegeleisen, Southfield, Mich., maker of safety helmets, include chic safari hats for women and sport caps for men.

Copyrighted material

"Charging's fine, but don't overdo it," says Mario Andretti, USAC National Champion in his rookie year.

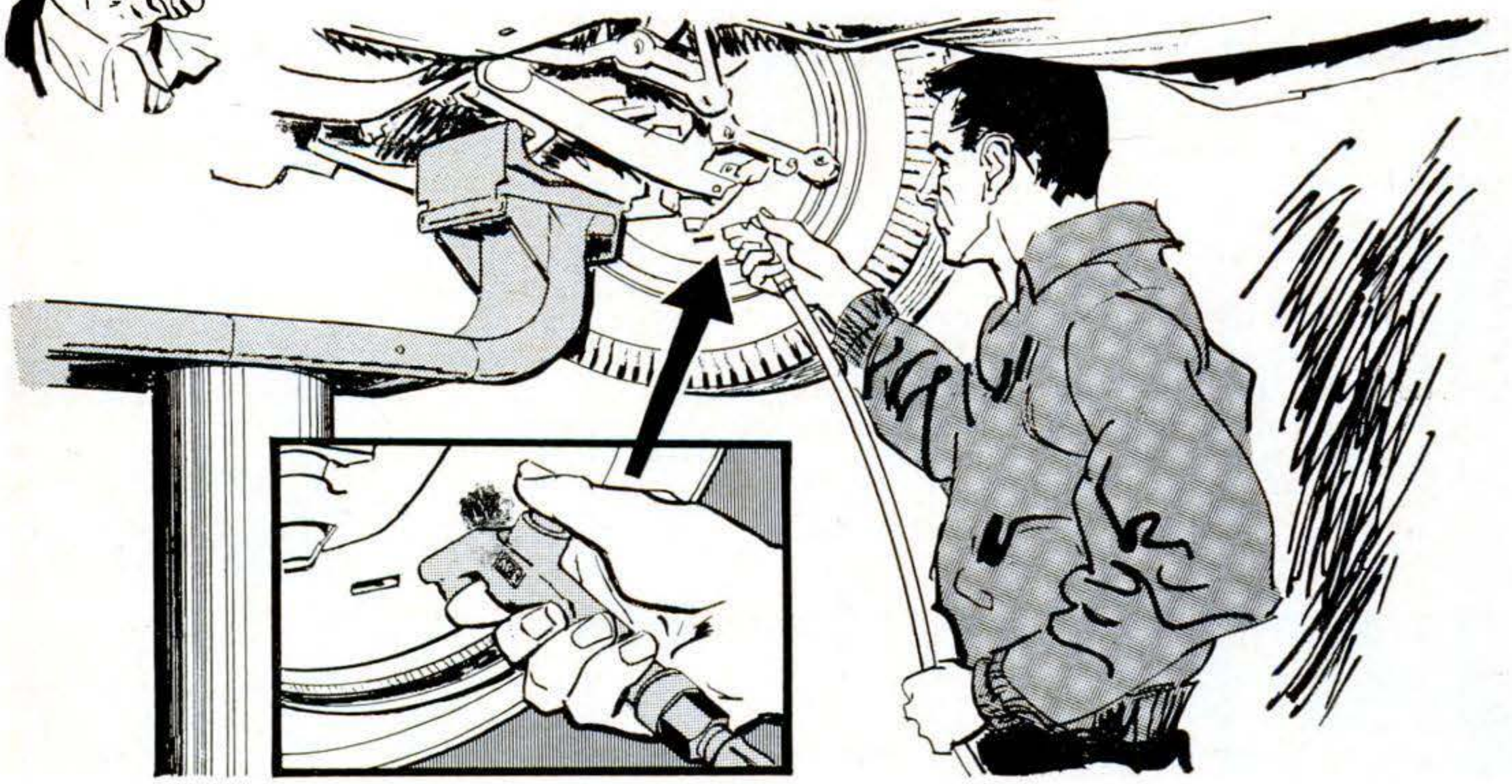
Any savvy car owner can tell you how to help a battery work efficiently longer: Keep it filled with water, free of corrosion, and fully charged But not one in 10 realizes that, just like on the race track, the charging bit can be overdone.

One survey indicates that overcharging causes 28 percent of battery failures, the result of too high a voltage regulator setting. Regulators are adjusted for so-called "normal" driving, but maybe you do more over-the-road driving at fairly high speeds than average. Or drive mostly in warm weather; temperatures above 80° help cause overcharging. A tip: Batteries being overcharged use extra water. If this happens, make sure your serviceman checks out the charging rate with a volt-amp meter. Here's another tip: Autolite sta•ful batteries hold as much as three times the usual amount of water above the plates for extra protection. And their new one-piece covers eliminate electrical leakage and top corrosion. Plus they're vibration guarded to keep material from shaking out of energy-producing plates. It costs more to build in these quality features, but Autolite feels they're worth it. So do I. **You're Always Right With Autolite.**

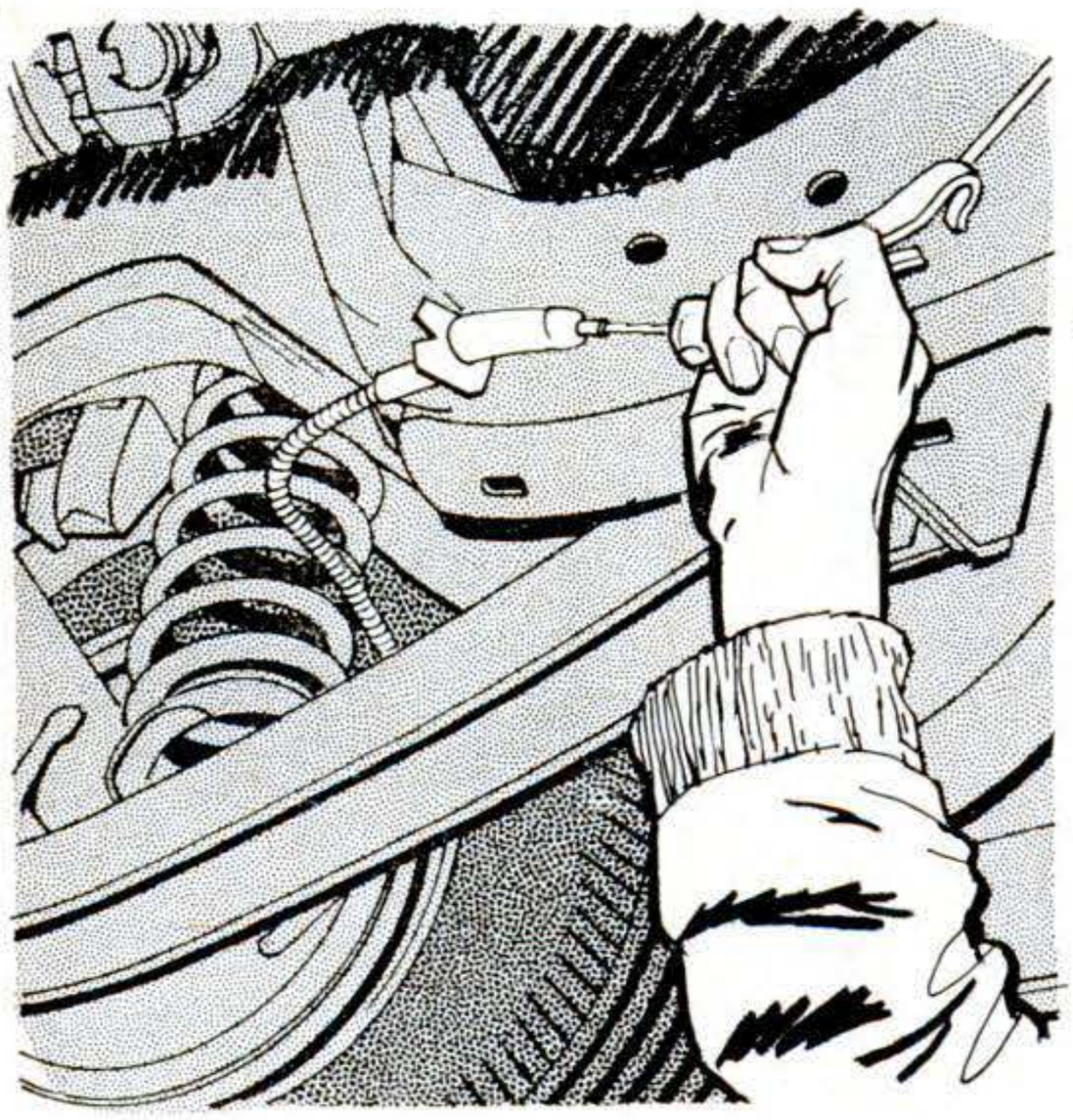


Copyrighted material

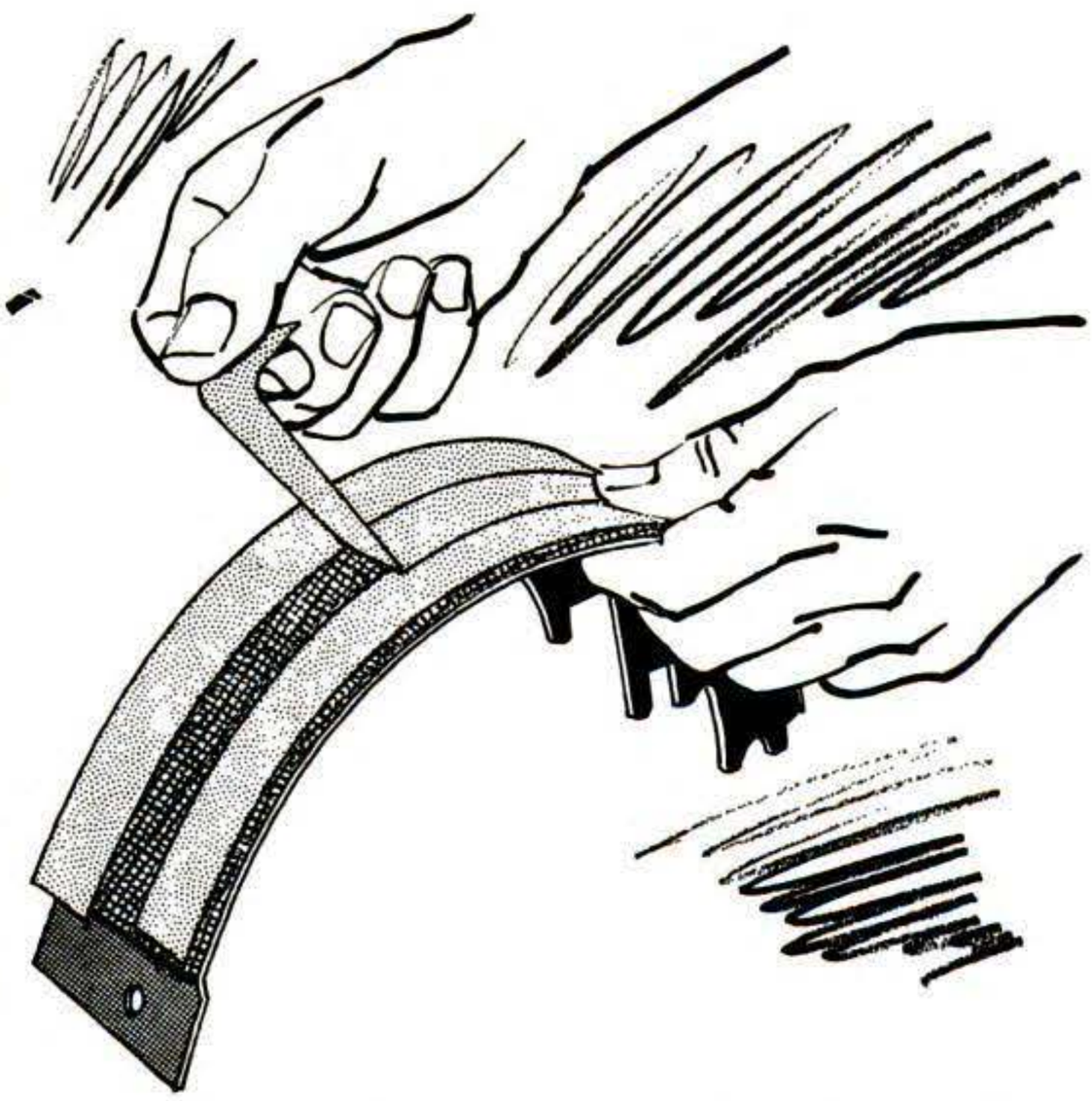
Hints from the Model Garage



Sometimes brakes will drag or squeal without any signs of mechanical trouble or fluid leaks. If this happens, have the car put on a lift at a service station, leaving all four wheels hanging free to rotate. Aim the air nozzle of the station's air hose into the brake-adjustment slot on the backing plate, first towards the front of the car, then towards the rear. Keep the wheels turning while two-to-three-second blasts of air force the dust out of the drums. Carry out this operation on all four wheels, and they should then run freely and quietly.



Suspect a noisy bearing in your rear axle? Check it by raising the rear end of the car, starting the engine, and engaging first gear or Low Range. Pull first one, then the other hand-brake cable. If the noise stops when the wheel stops, you've located the faulty bearing.



To avoid getting grease and/or brake fluid on the new linings during a brake job, cover them with a couple of strips of masking tape as soon as they have been riveted or bonded to the shoes. Remove the tape when the shoes are firmly in place on the backing plates.

Continued

Copyrighted material

Top Quality

USED CARS

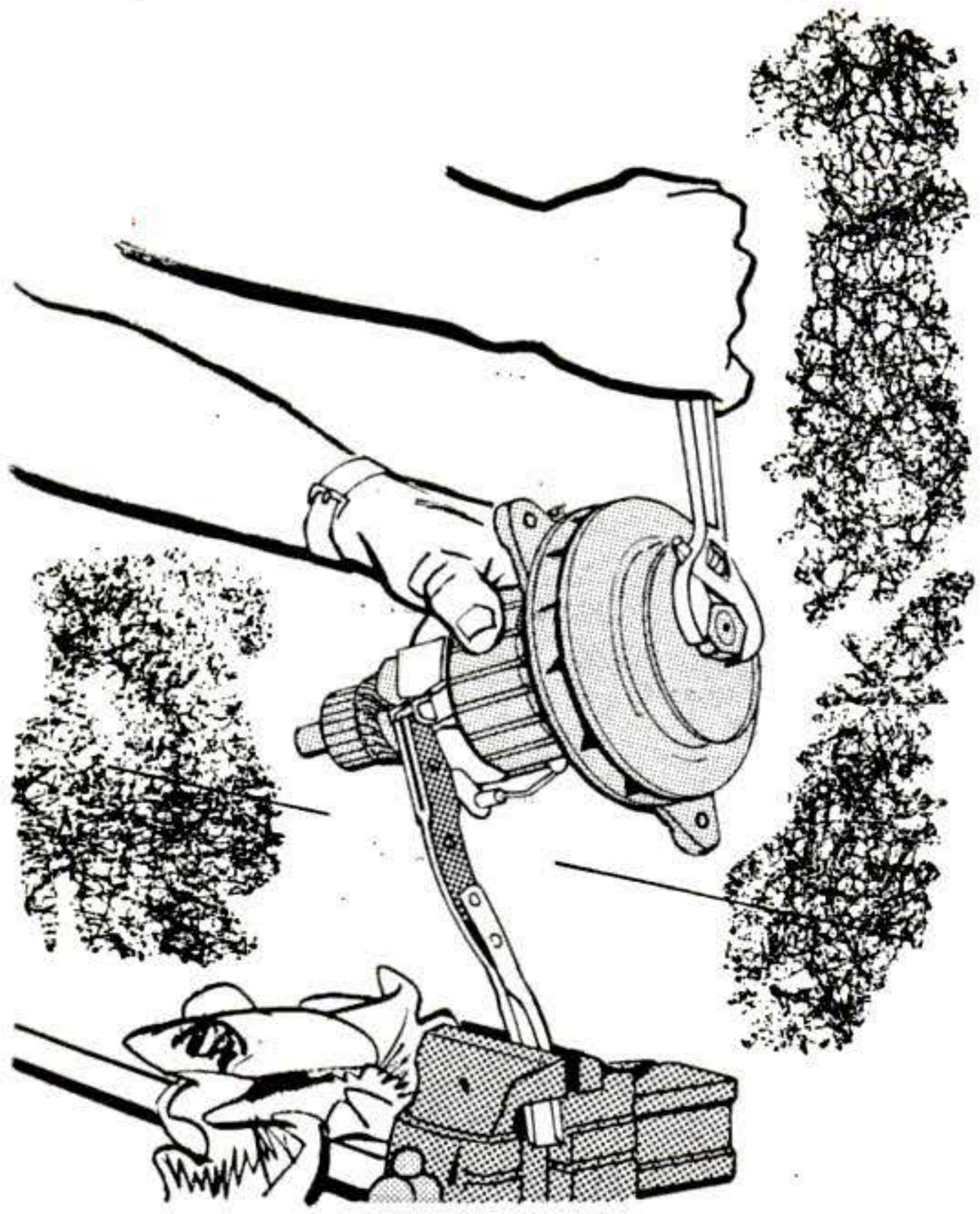
When you draw lots, hope you get ours.

A few colored lights can brighten up any used car lot.
But they still don't tell you much about the cars.
Here's a better indicator: The Top Quality Used Car sign,
at your nearby Chrysler and Plymouth Dealer's.
It's a sure sign of a responsible dealer.
And the first sign of a good used car.

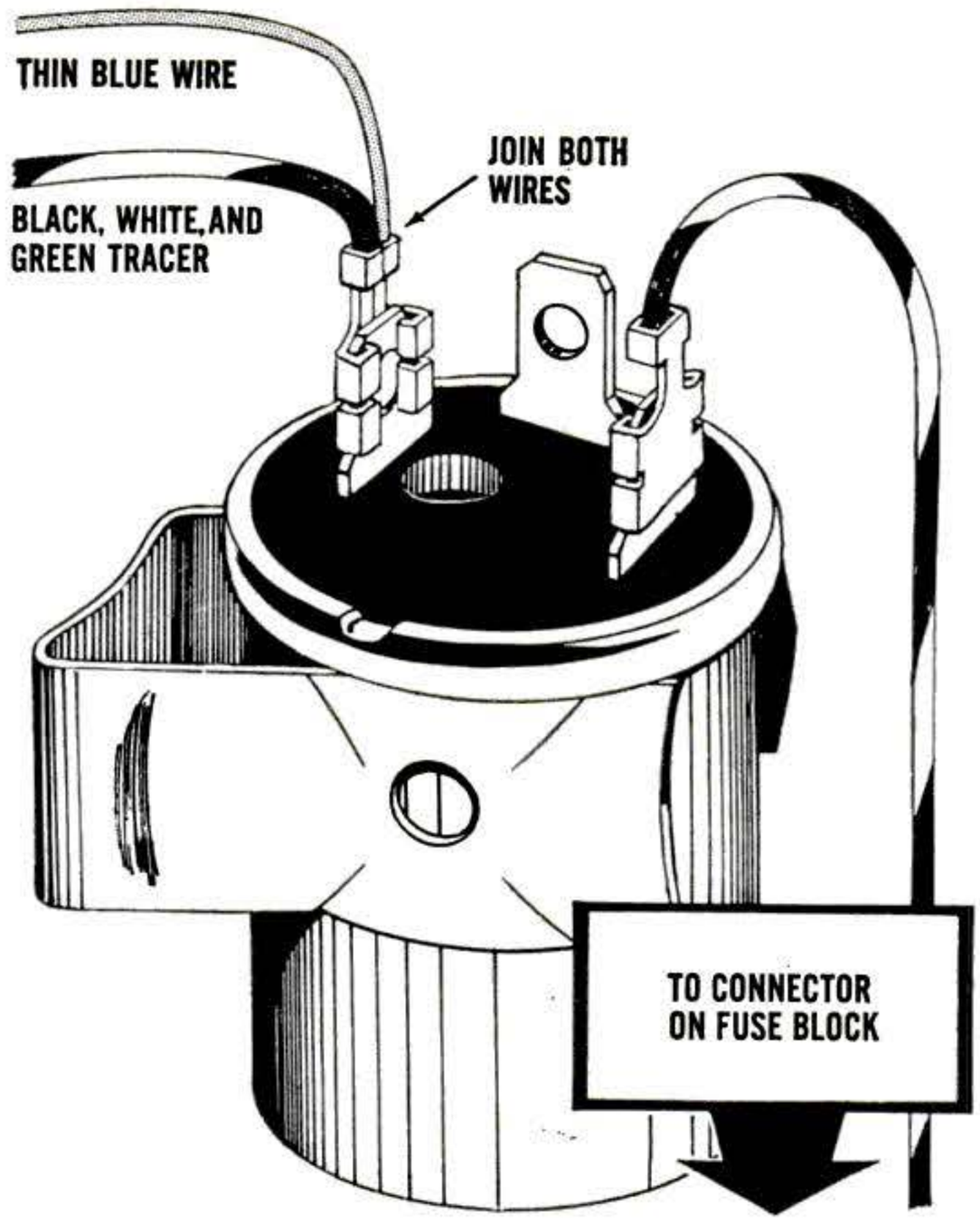
CHRYSLER-PLYMOUTH DIVISION CHRYSLER MOTORS CORPORATION

Copyrighted material

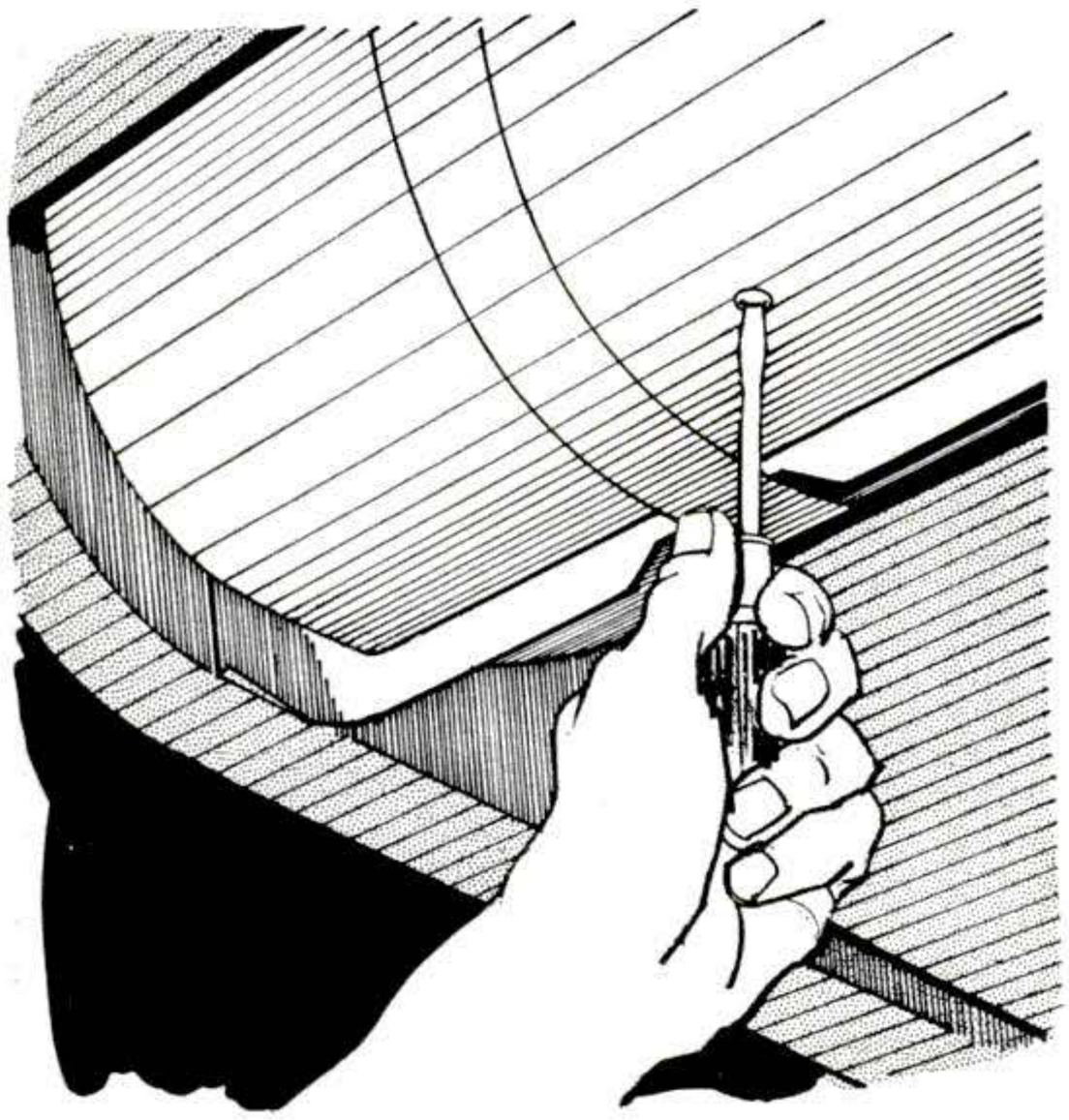
More Hints from the Model Garage



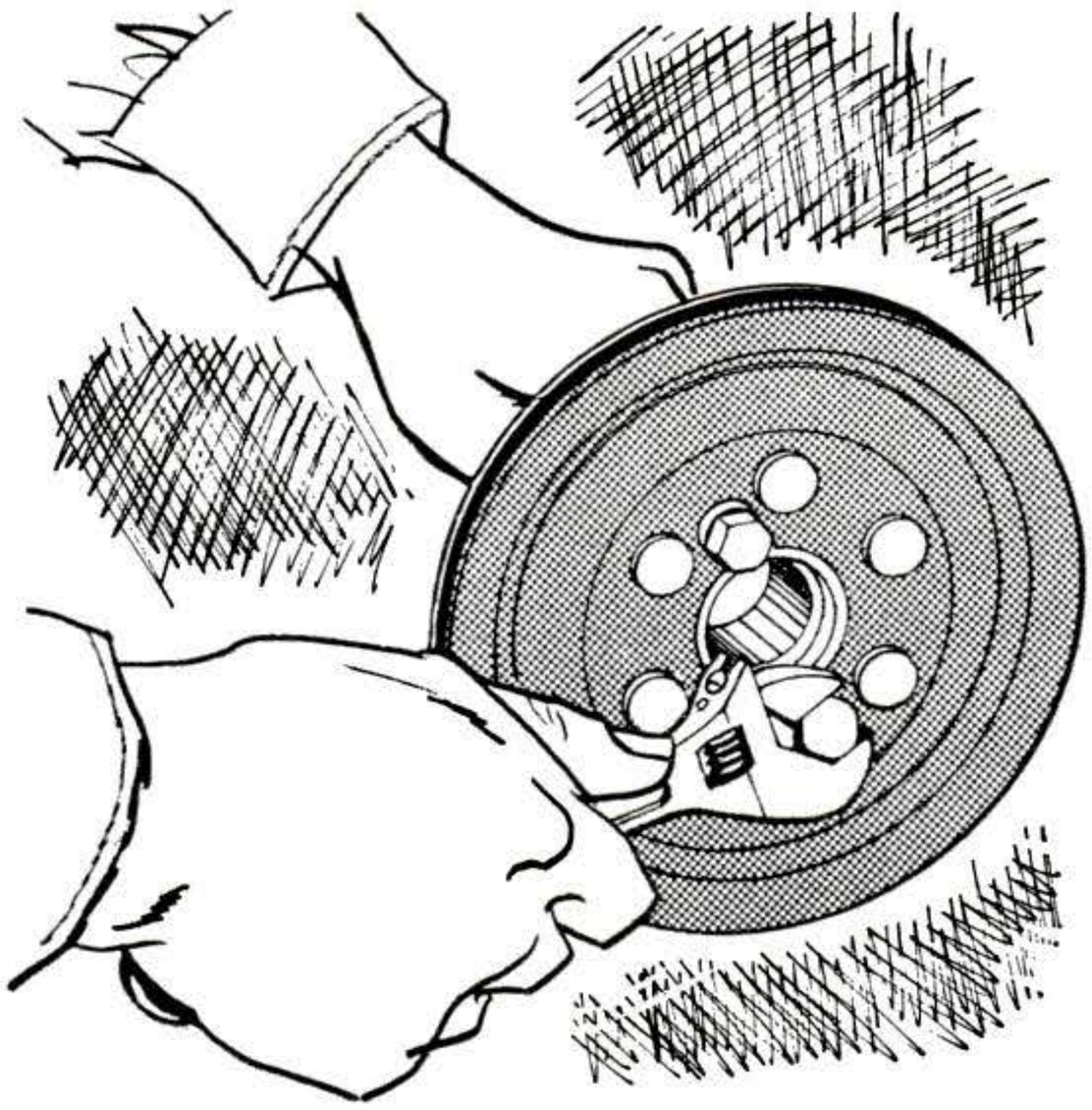
A sticky retainer nut on a generator pulley can be loosened with an oil-filter strap wrench. Place the wrench over the armature and clamp it in a vise. Turning the nut strengthens the grip in the armature, and the nut unscrews easily. To reassemble, reverse the procedure.



Need a replacement flasher for your VW? The Tung-Sol P-229-D six-volt flasher unit costs about $1. Join the thin blue wire from the harness to the black, white, and green tracer. This unit flashes immediately, and faster than the one that comes with the VW.



A leaky gas tank can be fixed without draining or removal. Run solder on the threads and under the head of a self-tapping roundhead sheet-metal screw and drive it into the leak site. Tin around the screwhead and solder around it. Avoid red-hot irons or open flame.



Noisy idling in a Corvair is often a sign that the crankshaft pulley has worked loose from its hub. Fix it by putting two ½"-by-⅜" standard capscrews with split-type lock washers in the pulley holes. This puts more tension on the pulley and keeps it firmly on the hub.

Copyrighted material

Our test cars are jolted over thousands of miles of granite blocks

(Above and below, Buick Electra 225)

. . . because your GM car might hit a stretch of bad pavement here and there. Reassuring isn't it?

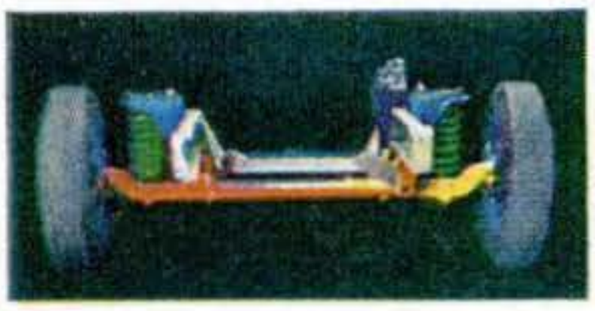
You can ask a lot from General Motors cars— General Motors does.

Chevrolet • Pontiac • Oldsmobile • Buick • Cadillac • With Body by Fisher

Copyrighted material

Independent tests prove Ford Pickups ride best. Be independent. Test-drive one yourself.

Don't take *our* word. Test reports by a leading independent research firm show Ford pickups rode more smoothly than the other leading makes. And scientific techniques assured testing accuracy. But no need to take *their* word, either. Check out Ford's ride yourself. Look into Ford's Twin-I-Beam suspension at your Ford dealer's. See how the two front axles work independently, so that shocks at one wheel aren't passed to the other. Or to the driver. Next, get behind the wheel. Give that pickup as independent a ride test as you can. You'll feel better. And so will we. Because either way—our independent tests or yours—you'll have the word.



Each of Ford's two front axles is a forged steel I-beam. Husky radius rods help hold wheel alignment. Together, they make the most durable independent suspension in any pickup.

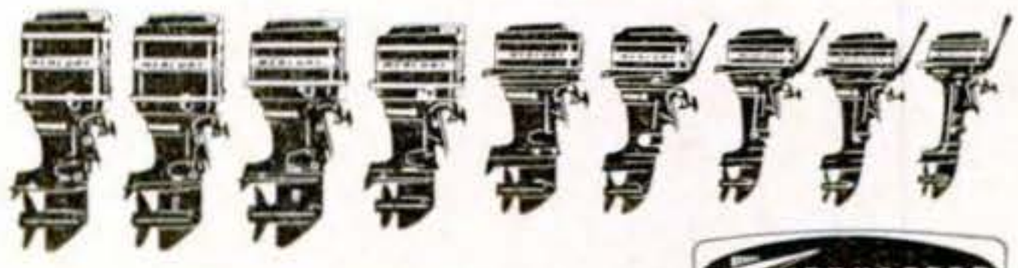
FORD/66

Copyrighted material

TEST

Continuous testing makes the '66 Mercurys the most dependable outboards ever built

Lake X. 11,000 acres in central Florida. Stumps, logs, sandbars, water hyacinths and wire grass. Average July high, 91°. Humidity, 89%. Water can be glassy-smooth—or 7-foot waves. Lake X is the world's toughest marine proving ground. Tough—and honest. Run by Mercury people who believe only in facts. There's no compromise, no quarter. We'll run outboards day and night for weeks at full throttle ... over timed, measured distances ... hit sandbars at 40 mph to test the shocks . . . plow through saw grass trying to clog the cooling system . . . run into logs, run in the rain, run wide open and at trolling speed, beat motors, take them apart, tabulate, compare. When we're through, there's little we don't know about an engine. Same thing happens at Mercury's Siesta Key, Florida, proving grounds. Tests are just as rough. Only this time the enemy is salt water, sandbars, oyster beds, rocks. This is how we test marine propulsion at Mercury, testing not only Mercurys, but other brands. This is how we know the score. It's one example of the plus you get with Mercury . . . dependability *plus performance*. See what we mean at your Mercury dealer. 3.9, 6, 9.8, 20, 35, 50, 65, 95 and 110 hp.



MERCURY

KIEKHAEFER MERCURY

FIRST IN MARINE PROPULSION

Kiekhaefer Corporation, Fond du Lac, Wisconsin and Kiekhaefer Mercury of Canada, Ltd., Subsidiary of Brunswick Corporation

Copyrighted material

FREE CATALOG.

250 "Do-It-Yourself" Electronic Kits At Up To 50% Savings

WHY BUILD HEATHKIT ELECTRONICS? A desire for top-quality products at 50% savings, to be sure. But it goes beyond that. The reason people choose Heathkit is pride. Not just the pride of owning something new, but something a bit better that you have created yourself! From watching your Heathkit grow and take shape from your own efforts. It's a labor of love and a lot of fun. The large pictorial diagrams and simple, step-by-step instructions make it easy. And when you finish and turn it on you'll know that unique self-satisfaction that comes with "do-it-yourself." You will have joined the millions of people, from ages 11 to 79, people with no special electronic skills or knowledge, who successfully build Heathkits. People like you! Give it a try. Your FREE Heathkit catalog is waiting for you now.

World's Largest Selection Of Electronic Kits

NEW Low Price On Heathkit 21" Color TV . . . Only $375.00

NEW Transistor FM Stereo Tuner That Assembles In 6 Hours Or Less . . . Only $49.95

NEW Low Prices On Many Heathkit Stereo/Hi-Fi Components

NEW Deluxe Shortwave Radio . . . Only $84.95

NEW 23-Channel, 5-Watt All-Transistor CB Transceiver . . . Only $89.95

- ★ See The Vast Selection Of Portable And Table Model AM, FM and Shortwave Radios
- ★ See The Famous Heathkit/Thomas Transistor Electronic Organs
- ★ See A Complete Selection Of Home & Hobby Items . . . Intercoms, Garage Door Opener, Automotive Kits, Tools, Color TV Sets
- ★ See All Heathkit Stereo/Hi-Fi Components . . . Tuners, Amplifiers, Speakers, Turntables, Cartridges, Furniture
- ★ See The Full Complement Of Heath Marine Electronics
- ★ See The Complete Line Of Citizen's Band Radio Gear . . . Transceivers, Walkie-Talkies, Accessories
- ★ See The Wide Selection Of Heath Educational Kits For Home Or Classroom Study
- ★ See The World's Largest Line Of Amateur Radio Gear
- ★ See The Full Line Of Heathkit Lab & Test Instruments For Home Workshop, Industrial & Educational Use

MAIL COUPON FOR YOUR FREE COPY

HEATHKIT®

HEATH COMPANY, Dept. 16-2
Benton Harbor, Michigan 49023
In Canada: Daystrom, Ltd., Cooksville, Ontario

☐ Please send FREE 1966 Heathkit Catalog

Name _____

Address _____

City _____ State _____ Zip _____

Prices & specifications subject to change without notice. CL-215

Copyrighted material

Front Drive Is Gaining Fast in Europe

[Continued from page 111]

has ever built—including their big 2000.

As the whole drive train is cradled in a well-isolated subframe, the 1300 is remarkably quiet. Both steering wheel and seats have ample adjustment. All wheels have independent suspension with coil springs, and the ride is free of pitch, although some roll occurs on hard cornering. The 1300 will not be exported in its first year, but the U.S. should get it in 1967.

What's new at Renault? The Government-owned French company brought out the front-drive R-4 in 1961. Renault's new front-drive R-16 is roomier, heavier, more powerful, and more luxurious. Like the Triumph, it has all-independent suspension, but with torsion bars instead of coil springs. The four-cylinder 70-hp. engine sits longitudinally in the car, with its transmission and final drive on the centerline in front. The body is half station wagon, half fastback, making the car immensely practical, yet distinctive in styling. Now the largest cars as well as the smallest (R-4) from Renault have front drive; in time, the entire range will surely switch to this design. The Renault executives in favor of rear engines (Dauphine, R-8, R-10) are no longer in charge of product planning, I was told in Paris, and the new chief engineer is an advocate of front drive.

The future of front drive. I also heard rumors of a front-drive Simca, presumably to fill the gap between the rear-engined 900/1000 series and the conventional 1300/1500 line. Italy's front-drive Autobianchi Primula is really a Fiat design, and this car may eventually replace the Fiat 1100, now in its 13th year.

Further front-drive gains? There's nothing imminent. It's too early to talk of Volkswagen and Porsche making the change. Still, Europe will produce close to two million front-drive cars this year. Here's a breakdown of my estimate:

Make and Model	Quantity
Audi (Auto Union)	40,000
Austin 1800	50,000
Autobianchi Primula	50,000
Citroën 2 CV	150,000
Citroën Ami-6	180,000
Citroën ID and DS	80,000
DKW (Auto Union)	40,000
Ford Taunus 12-M	220,000
Innocenti	50,000
Lancia Fulvia	50,000

Continued

You, too, can enjoy this kind of money in your own business

..."made $1200.00 on one job"

Some make more, some less . . .

We help you start Your Own all-year business—*Make BIG Money!*

• With our easily operated, highly efficient WALL DETERGER, G. H. Jones made $1200.00 on one job. E. L. Goss took in more than $10,000 in one year. E. C. Taber wrote, "I made $400.00 gross in two weeks." And no wonder...this machine washes walls 6 times faster and better than by hand—with no mess...no drop cloths. Also postpones repainting many years.

Your Money-Making Opportunity • We want more men to go into this profitable business for themselves and enjoy financial independence...freedom from layoffs and bosses. Customers everywhere—homes, offices, schools, churches, hotels & motels, etc. How much you earn depends largely on you. Training and consulting with experts is available at no additional cost.

Start Part-Time If You Wish • Many start part-time and keep their present job until full time is justified. You need no special skill or experience. Many earn the entire cost in a week or two from the supplies that come with the machine. What you take in is mostly profit. No need to rent shop or office; operate from home.

Ours Is Not A Lease Arrangement • You are free to operate independently. *You* sign no contract. *You* own the Wall Deterger and are *your own boss. You* pay no fees, or dues, or royalties, and enough supplies come with it to return far more than your small investment. It costs nothing to get details...write TODAY.

FREE BOOK

VON SCHRADER MFG. CO.
211 "W" Pl., Racine, Wisconsin
Please rush FREE booklet about your WALL WASHING MACHINE and how I can start *my own* permanent, profitable business.

Name_____

Address_____

City_____ State_____ Zip_____

VON SCHRADER MFG. CO.

Copyrighted material

ALL NEW for '66

120 latest home designs–in all styles and sizes.

ONLY $1.00

Or all 5 books for 2.50

Other Home Plan Books available indicate your choice and mail with check or money order today.

☐ **Traditional Homes**—fine selection of 1, 1½ and 2 story, 2 to 4 bedroom ..... 50¢

☐ **All American Homes**—120 designs in various styles and construction ..... 50¢

☐ **Income Property & Retirement Homes**—125 multiple units and small residential homes ..... 50¢

☐ **Ranch & Suburban**—125 popular designs conventional and contemporary ..... 50¢

☐ Or order *all five* books 2.50

Name

Address

City/State $ Amount Enclosed

L. F. GARLINGHOUSE CO., INC.
Dept. PS266 Topeka, Kansas 66601

BOAT KIT Catalog FREE

FIBERGLASS OR PLYWOOD

Save $1000 to $2500 on 18', 20' 22' Luger Luxury Cruisers . . . save to $4000 on 22' Houseboat and 26' and 30' Cruisers . . . to $500 on speedy 14' or 16' Molded Fiberglass Runabouts! *Over 50 Models!* Easily assembled. Every part and every section pre-cut, pre-assembled or precision molded. Just put together! 3 Years to Pay! MONEY BACK GUARANTEE! Rush name, address for full color catalog—56 pages—FREE!

Low Down Payment EASY TERMS

LUGER BOAT KITS, Dept. A-26
9200 Access, Minneapolis, Minn. 55431

BUILD REFINISH RESTORE

...anything of wood

LET Constantine's picture-packed Catalog & Manual help you build new furniture—refinish and restore beat-up cabinets, chests, tables, chairs, etc. See everything you need for better, easier woodworking. All materials plus plans, books, instructions. *60 glamorous woods in natural color.* Hundreds of products found nowhere else. 8-ft veneers! Fabulous glue that needs no clamps. Tool bargains. Cabinet hdwe, etc. *Unsurpassed values since 1812.*

2,000 CRAFTSMAN PRODUCTS

World's Beautiful Woods & Veneers
Newest Workshop Tools & Materials
Wood Finishes — All Kinds
Lamp Parts — Upholstery Supplies
Period & Modern Furniture Hardware
Colonial Clock Kits — Cane Kits
500 Project Plans! Instructions!

MAIL AD

Tear out ad. Mail with 25¢ for vast new CATALOG Plus New "101 Project Ideas"

CONSTANTINE
2050 Eastchester Rd., Bronx N.Y. 10461 Dept. B-6

Front Drive Is Gaining Fast in Europe

Lancia Flavia	20,000
Mini-Minor (BMC 850)	300,000
MG 1100 (BMC 1100)	200,000
Panhard 24 CT	10,000
Peugeot 204	80,000
Renault R-4	200,000
Renault R-16	80,000
SAAB	45,000
Triumph 1300	50,000
Total	1,895,000

Add to the above some 65,000 Oldsmobiles and a couple of hundred Cord replicas from Tulsa, Okla., and the world has the two-million mark clearly within reach.

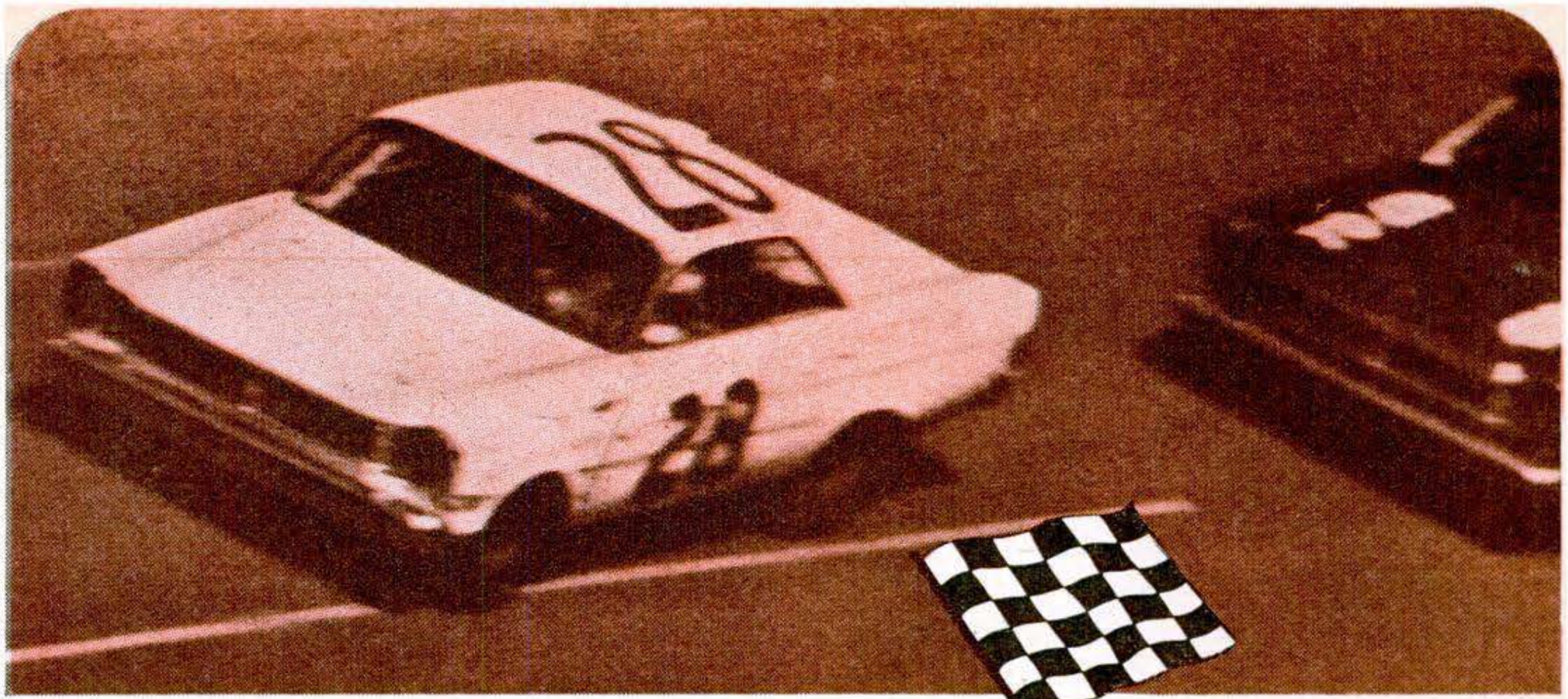
What's new at Rolls-Royce? For years, the Rolls-Royce technical specifications have been as far behind the times as the Checker Cab's. The Silver Shadow has changed all that. In some ways, the Rolls is getting more and more like an American luxury car—but Rolls-Royce engineers can be far more audacious since cost means less to them than to Detroit. But there may be one valuable lesson for Detroit in the Silver Shadow: the rear supension. Rolls-Royce dropped the rear axle because a linkage assuring proper axle location under all conditions turned out to be just as expensive as an independent suspension system.

The Silver Shadow's rear wheels are carried by trailing A arms mounted in rubber bushings on a subframe. The final drive is bolted to the subframe, which means that the drive shafts are free of torque reaction. This makes for improved traction. The unsprung weight is reduced (in comparison with the rigid axle), which assures improved ride comfort, reduced tire wear, and better road-holding on turns. The trailing arms control camber changes on deflection, reducing rear-wheel steering on bad roads or during hard cornering. Since no space is needed for axle movements, the useful trunk space is bigger.

The coil springs are combined with a device to keep the car level regardless of load. A hydraulic ram on top of each coil spring displaces the suspension to compensate for changes in weight distribution.

On the other hand, the Silver Shadow borrows heavily from U.S. practice. The transmission is built in England under a Hydra-Matic license. The steering gear is a Saginaw product. The unit-construction body is built by the Pressed Steel Co., British licensee of the Budd Corporation. PS

Copyrighted material



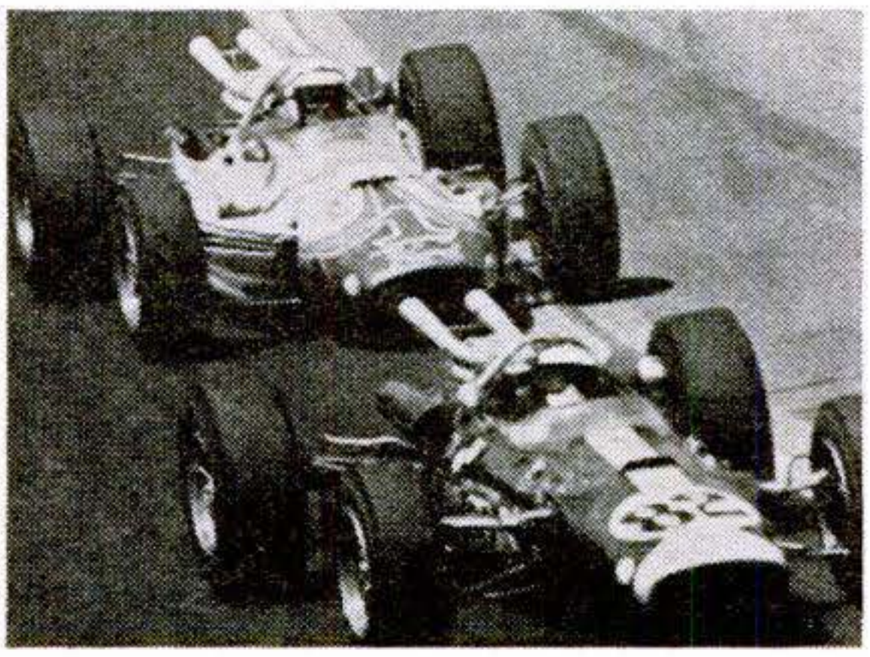
EVERY MAJOR USAC AND NASCAR WINNER IN '65 USED PERFECT CIRCLE VALVE SEALS

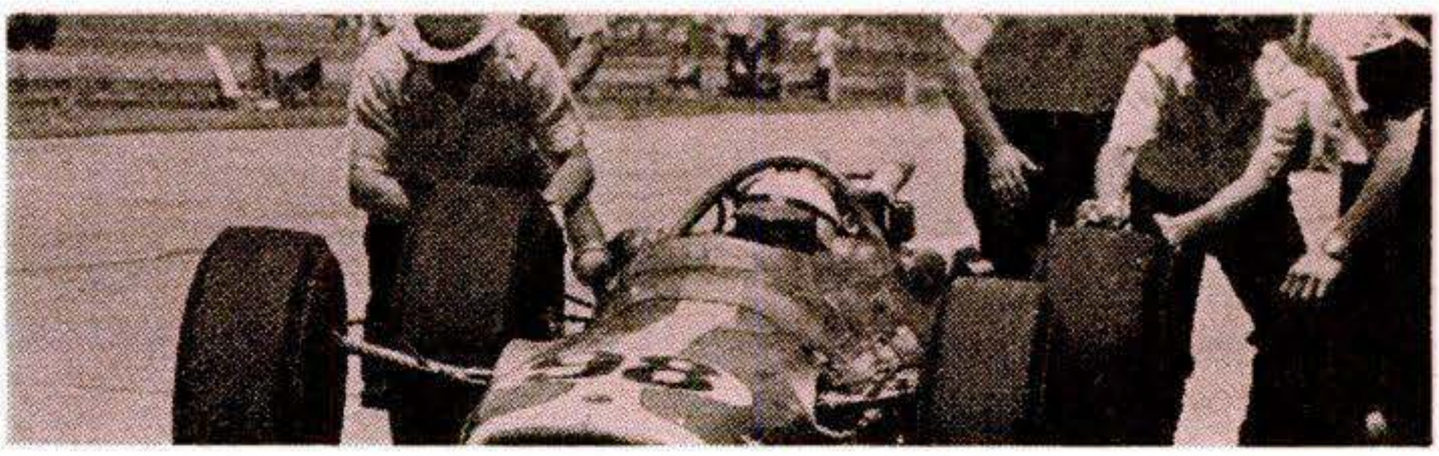
The results are in . . . and they prove conclusively that racing engines equipped with Perfect Circle Valve Seals have a way of crossing the finish line first. Racing drivers know that PC Valve Seals prevent performance-cutting oil loss through valve guides, stop valve sticking, control harmful carbon build-up in the ports. And PC seals will do the same job in *your* engine. Two basic designs . . . Teflon*-and-Rubber, and All-Teflon . . . handle all engine requirements. Install PC Valve Seals next time you re-ring.

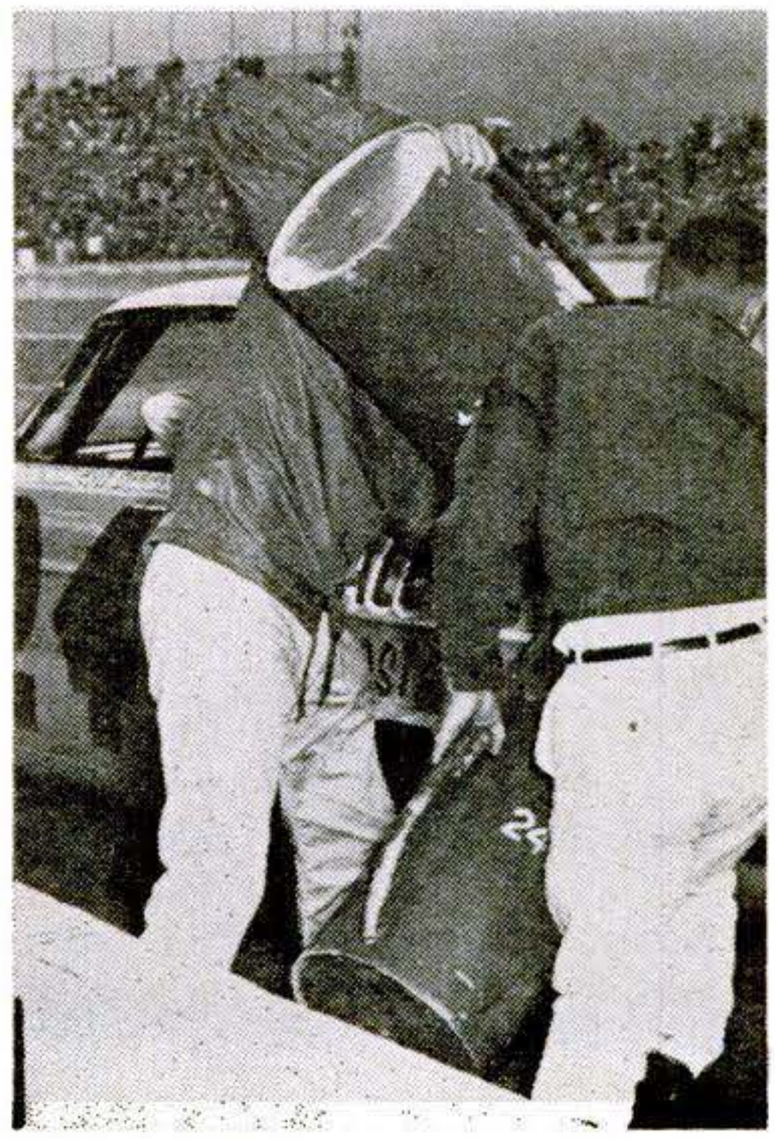
*Registered trademark for DuPont fluorocarbon resin finishes

PERFECT CIRCLE

DANA PARTS COMPANY — DANA — DANA CORPORATION

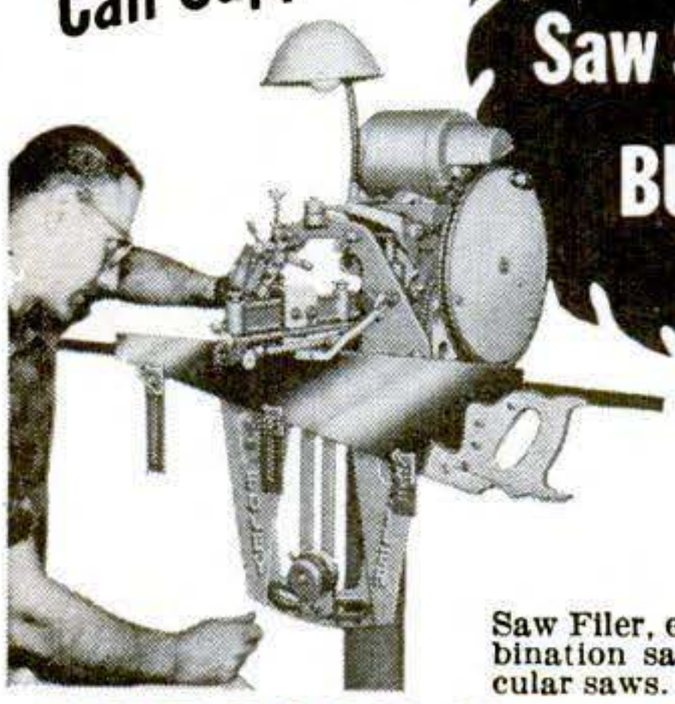






Copyrighted material

DID YOU KNOW THAT
Your Neighborhood Can Support a
PROFITABLE Saw Sharpening BUSINESS?



Start a steady CASH business in your neighborhood. Earn $3 to $6 an hour in your spare-time! Excellent profits in saw sharpening business! Automatic Foley Saw Filer, easy to operate, files combination saws, hand, band and circular saws. No experience needed.

FREE BOOK Shows How to Start!

Fact filled booklet tells you how to start a spare-time business immediately; how to get new business. Rush coupon now; get "Money Making Facts" and details on Easy Payment Plan. No Salesman will call.

FOLEY Manufacturing Co.
Room 2336-6 Foley Bldg., Minneapolis, Minn. 55418

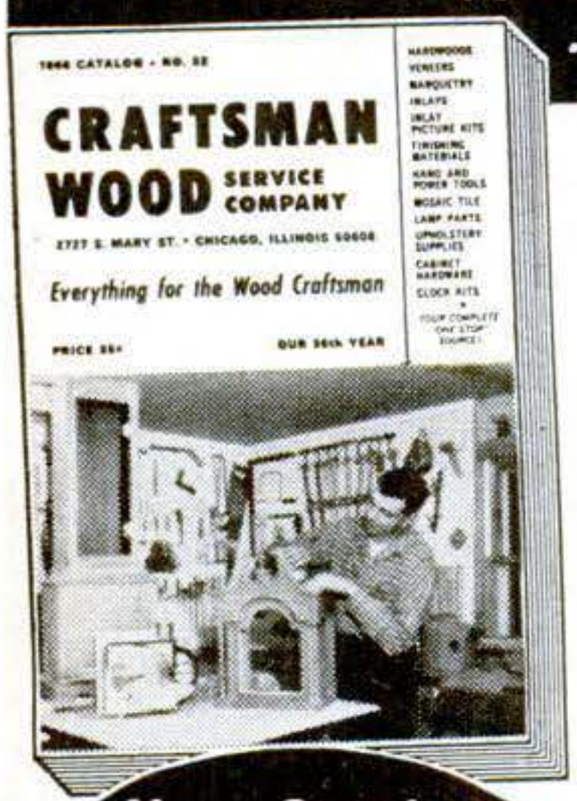
Send FREE BOOK—"Money Making Facts" and Time Payment Plan.

Name_____

Address_____

City_____ State_____ Zip Code_____

Save Money on WOOD
Hardwood Veneers . . . Hardware . . .
Wood Shop Supplies and Equipment
. . . Power Tools



Hardwoods, Fine Plywoods, Inlays, Mouldings, Mosaic Tile, Tools, Lamp Parts, Upholstery Supplies

Your new MONEY SAVING wood and workshop buying guide now ready! 140 page. Full color! Your best "one stop" source for finest kiln dried domestic and imported hardwoods, veneers, plywoods, modern and traditional legs . . . over 1500 items.

STANLEY TOOLS at Discounts

Startling savings on top name power tools, hard to find cabinet hardware, lamp and upholstery supplies. New projects and kits. Enclose 35¢ to help pay mailing and handling costs. Mail coupon.

New Catalog
over 1500 items
Now Ready!

CRAFTSMAN
WOOD SERVICE COMPANY
2729 South Mary, Chicago, Illinois 60608. Dept. B-26
Rush new Craftsman WOOD Catalog. I enclose 35¢ to help pay mailing cost.

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP CODE_____

The Woodworking Champ of Any Shop

[*Continued from page 171*]

to check all the components. You can notch the back apron to fit the column support.

The table comes next. Don't change the overall size. If any change must be made, it will probably be in the distance from the center of the table hole to the back edge of the table. This will depend on the size of your drill press. The hole should be centered directly under the drill-press chuck.

Forming the table. Use two pieces of stock. This makes it easy to cut the T-shaped slot for the pivot guide. First cut the two pieces to size, then butt them together and mark for the center hole. Cut the center hole on a jigsaw or bandsaw. Then saw twin grooves down the exact center of the mating edges. Join the two pieces by gluing a spline from the center hole to the back edge, but use glue alone from the center hole to the *front* edge.

After the glue is dry, set your saw blade to a height of about 3/16″ and, with the top surface of the table down, run a ⅛″ groove directly down the center from the front edge to the center hole.

The slots in the table can be cut on the table saw by using a dado or by making repeat passes. These should not be longer than the distance from the center of the table hole to the back edge of the table.

Drill the two holes for the fulcrum pins to fit ⅜″ tee nuts and press these in place. Then attach the table to the base with eight No. 8 F.H. screws, 1½″ long.

Most important parts of the shaper-fence assemblies are the ½″-by-½″ guides. These must be centered accurately under the fence blocks and they must fit snugly in the table slots. Any wobble will cause problems when using the fences.

The drilling fence and the hole-spacer assembly are fairly straightforward. To secure the ¼″ threaded rod, merely drill an undersize hole in the top edge of the fence and screw the rod in place. The nut on the rod is adjusted to support the slotted bar at various heights for different sizes of work. The hole for the drill-rod pin must make a tight fit.

The pivot guide is a strip of hardwood sanded to final dimensions so it will be a precise fit in the T slot. If you wish, you can drill additional holes in it for the roofing-nail pivot to get greater variation in distance between the pivot point and the cutting tool. PS

Copyrighted material

Presto! – Top's up for shade or showers.

Big skiing fun – small boat handling ease.

90 hp a-go-go . . . by Johnson

A dash of the devil!

— that's the Johnson "Caprice" — raffish little pocket-yacht with touches of grandeur. Ingenious use of space creates lavish surprises in only 14'-9". Like 4 bucket seats that unfold into lounges, convertible top, padded coaming, storage compartments, safety glass tinted windshield that folds down for a faceful of breeze. (Or open a special vent under the windshield for a gentle flow of air.) Power is a hot-blooded 90 hp mill that's quick and quiet — like all Johnsons. New "SeaFoil"® hull, the hydro-lift design that has the *smooth* way in rough water, provides 31½ sq. ft. of cockpit space. For all her hustle she leaves a well-mannered wake — a skier's delight. Easy to dock, easy to trail, easy to love — that's Caprice! Rendezvous at your Johnson Boats dealer!
See all 5 new Johnson Boats — 3 with new "SeaFoil" hull . . .
2 with the popular three-point hull — 14'9" to 19'1" . . . 90 to 200 hp.

ANOTHER NEW *Johnson Boat* WITH SEAFOIL® HULL

A quality product by the maker of Johnson Sea-Horse Motors and Skee-Horse Snowmobiles.
Johnson Motors, Dept. PS-B10, Waukegan, Illinois 60086

Copyrighted material

GRINDS POLISHES
DRILLS SHARPENS
CARVES DEBURRS

No. 2 Moto-Tool Kit Illustrated

MOTO-TOOL
THE POCKET SIZE MACHINE SHOP

Handiest tool you'll ever own. Does fine detail work with pin point accuracy. Eliminates time consuming hand work. Gets into places difficult to reach with larger tools. 27,000 RPM. Collet sizes 1/8", 3/32" and 1/16". An industrial favorite since 1936. Wt. 13 oz.

NO. 2 MOTO-TOOL only $19.95
NO. 2 MOTO-TOOL KIT with 23 accessories in steel case $29.95

NEW HEAVY DUTY NO. 3 MOTO-TOOL

New high torque motor designed for hard industrial use. Same features as No. 2 plus 50% increase in power.
NO. 3 MOTO-TOOL only in steel case $29.95
NO. 3 MOTO-TOOL, 23 accessories, steel case .. $37.95

SEE YOUR DEALER OR WRITE FOR CATALOG
Dremel Mfg. Co. • Dept. 126-B • Racine, Wis.

MAKE GOOD MONEY
SPARE TIME OR FULL TIME

Just Show ANY Homeowner FULL COLOR CATALOG of Fabulous, Exclusive STARK

DWARF FRUIT TREES

No taller than Lilac Bush, but Grow BUSHELS of GIANT Apples, Peaches, Pears, Cherries!

Men! Women! Cash in on huge demand for amazing Patented Dwarf Fruit Trees, available only from Stark Bro's. Even city, suburb homeowners with "Postage-Stamp" size yards buy when they see Dwarf Trees can give them a home orchard, often in 2 years, with GIANT fruit for eating, canning, freezing, or to sell for profit. Imagine! They can plant up to 9 Dwarf Trees in 20 ft. sq. area, can pick topmost fruit without ladder! Almost everyone's eager to order from you on sight!

No Investment! No Inventory! We ship at Correct Planting Time! You Get Big Profits in Advance!

You never invest 1c! Just carry full-color catalog of Stark Bro's Dwarf Fruit Trees, Shade Trees, Roses, Shrubs. Take orders any day of year, collect BIG PROFIT IN ADVANCE. More fun than work!

FREE! Money-Making Full-Color Sales Outfit!

Send no money! Fill in, mail coupon for everything you need to start making money first day—all FREE, postpaid, no obligation. Send the Coupon Today!

STARK BRO'S, Desk 27426, Louisiana, Mo. 63353

STARK BRO'S, Desk 27426, Louisiana, Mo. 63353
Rush big Stark Bro's 150th Anniversary Money-Making Full Color Sales Outfit FREE with everything I need to start making money NOW, even spare time.

Miss
Mrs.
Mr. .....
1st Initial 2nd Initial Print Last Name

Address .....

Town & State ..... Zip Code .....

Popular Science's 9-in-1 Troubleshooter

[Continued from page 116]

For resistance measurements: Calibrate the ohmmeter circuit each time you use it by adjusting control R23 for full-scale deflection of the meter.

Caution! Before measuring resistance, be sure to unplug the appliance you're servicing. The ohmmeter circuits, and meter M1, will be destroyed if you accidentally touch the test leads across 120-volts AC.

Always keep function-switch S3 in the "AC volts" position when you aren't actually using the ohmmeter to avoid unnecessary drain on battery B1. It's time to replace B1 when adjusting R23 will no longer give a full-scale reading.

Using the battery tester. Plug the positive test lead (red) pin plug into the (+) jack that corresponds to the battery's voltage and type. Rotate S1 to the matching position, and touch the test leads to the battery's terminals. Be sure S2 is at the "internal-load" position.

During the test, the battery analyzer simulates the dry cell's operating conditions with an appropriate load resistor that's connected across the cell.

A good battery has the capacity to maintain its rated voltage under load; a bad battery doesn't—its terminal voltage drops far below the nominal value.

The most accurate guide to battery capacity is a reading taken when the battery is actually at work—when it is installed in the device it normally powers, and the device is turned on. For this test, an artificial load is unnecessary, so flip S2 to "External Load." PS

Label the modules this way:

Battery-analyzer pin jacks and switch S2

1. 1.4-volt mercury cell (+)
2. 1.5-volt "AA" pencell (+)
3. 1.5-volt "C" and "D" cells (+)
4. 1.5-volt "ignition" cell (+)
5. 3-volt battery (+)
6. 4.5-volt battery (+)
7. 6-volt "ignition" battery (+)
8. 6-volt "lantern" battery (+)
9. 7.5-volt battery (+)
10. 9-volt transistor battery (+)
11. 12-volt "lighting" battery (+)
12. Negative terminal—all batteries

S2 closed—"Internal Load"
S2 open—"External Load"

Appliance checker jacks and controls

J1, J2—"AC volts input"
J3, J4—"Ohms input"
S3—"AC volts; ohms" (see schematic diagram)
S4 closed—"O-25-volts AC"
S4 open—"O-250-volts AC"
R23—"Ohms adjust"

Copyrighted material

Don't Buy Batteries Save $—Recharge Them!

over and over up to 15 times or more the *EVERLITE* — the best — charges more than all the rest.

Only the New EVERLITE

- **Charges 6 at one time.**
- **Charges 3 times faster.**
- **Charges *all* batteries.**

Be prepared. Always have fresh batteries when you need them. The EVERLITE is the only charger made which charges **all** batteries, flashlight, lanterns, toys, radio, telephone, hearing aids cameras—yes even mercury cells. Save money and have the convenience of fresh batteries always.

The EVERLITE is the best—**the only charger** built with a powerful magnetic energy winding. This power enables it to charge big lantern batteries and even car batteries. Also plays transistor radios on 115V. house current charging the batteries at the same time. **Charges all batteries better.**

Two models—the EVERLITE 75 for all dry cell batteries up to 12 volts and the EVERLITE 76 for all dry batteries **plus** a special charge for car batteries to assure fast starts on cold mornings. Simple, safe, fool-proof and unbelievably efficient. Plug into any 115 volt outlet. Guaranteed for one year. Send for your EVERLITE now—10 day money back guarantee,—You must be satisfied.

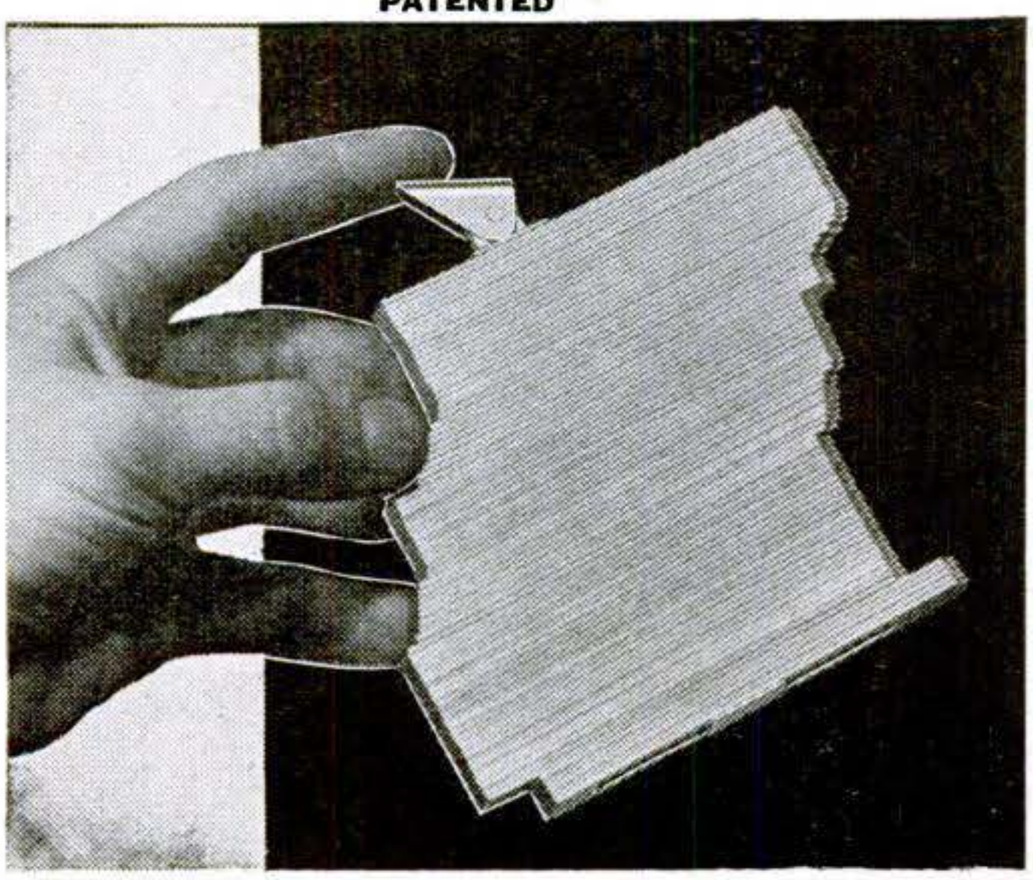
New transistor-ized model only $6.95

Model 75

Free battery tester and adapter for special batteries included.
The EVERLITE 75—send $6.95 plus .65 for shipping.
The EVERLITE 76 (including car battery kit)—send $8.95 plus .75 for shipping.

CONTOUR COPY

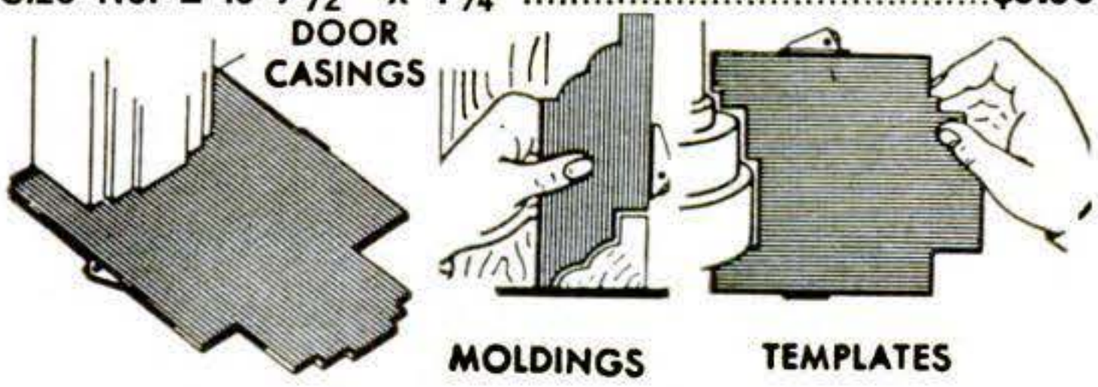
PATENTED



A PRECISION LIFETIME TOOL—$6.90

Made of hardened aluminum alloy—will retain its accuracy indefinitely.

Size No. 1 is 4¼" x 4¼" **$6.90**
Size No. 2 is 7½" x 4¼" **$9.90**



COPY ANY CONTOUR INSTANTLY
Perfectly Accurate Every Time.

SAVES HOURS—SAVES MATERIAL. Can pay for itself on one job. The perfect tool for fitting in against door casings, bath fixtures, mouldings, pipes, sinks, masonry, etc. A real boon to pattern makers, sheet metal mechanics, tool makers and body men.

EASY TO USE—just push the gauge leaves against any contour and lock. A perfect template every time. Works against any surface or any material.

Order Now from Master Mechanic Co.

Send $1.00 deposit if you wish C.O.D. shipment.
All items guaranteed for 1 year plus 10 day moneyback guarantee. Immediate delivery.

Mail order to Master Mechanic Co. Dept. B26
Box A, Burlington, Wisc., or Box 98, Sarasota, Fla.

Send_____EVERLITE 75 chargers $6.95 ea. plus .65 shipping.
Send_____EVERLITE 76 (incl. car battery kit) $8.95 ea. plus .75 shipping.
Send_____No. 1 Contour Copies $6.90 ea. plus .55 shipping.
Send_____No. 2 Contour Copies $9.90 ea. plus .65 shipping.

Name_____

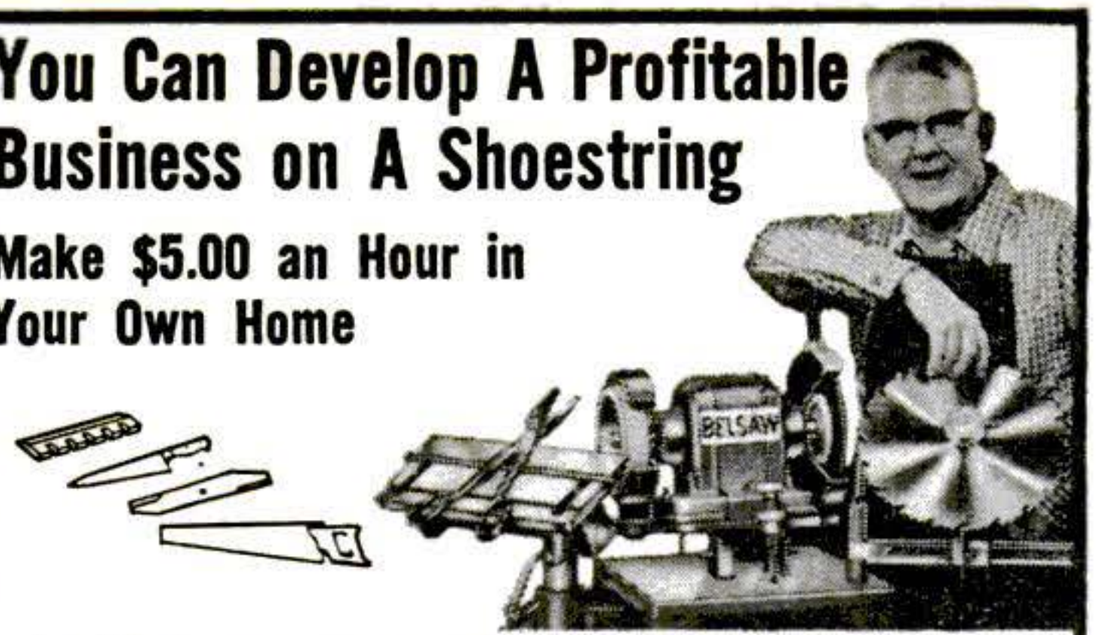
Address_____

City_____State_____Zip_____

Copyrighted material

You Can Develop A Profitable Business on A Shoestring

Make $5.00 an Hour in Your Own Home



I wish there was space here to print the hundreds of letters received from men I've put in business with the *Belsaw Sharp-All*. With this precision machine you can sharpen all popular household, garden and shop tools easily and quickly. You need no previous experience . . . no inventory, no selling, no space to rent.

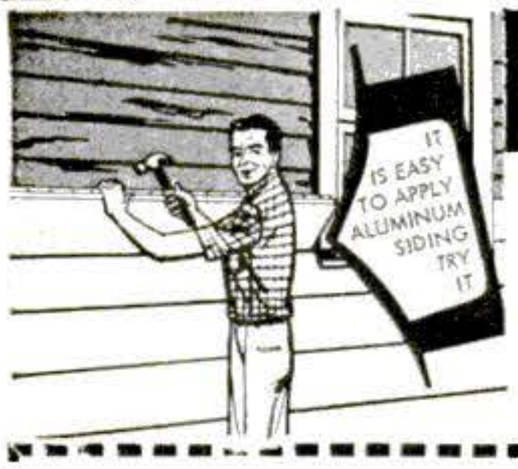
I've Done It for 40,000 Men

I have been helping men get into this profitable business for over 30 years. I'll finance you to get started . . . give you all the instructions and help you'll need to really succeed. I'll keep you informed HOW others are making big cash profits every day. No obligation.

So don't delay. Send coupon for FREE book today.

STAN FIELD, President
Belsaw Sharp-All Company
706Y Field Bldg., Kansas City, Mo. 64111

Name_____
Address_____
City_____ St._____ Zip_____



ALUMINUM SIDING

Learn how you can earn up to $1000.00 per sale, showing our quality aluminum siding on your home.

TO: ALUMINUM INDUSTRIES, Dept. C-26
KANSAS CITY 11, MISSOURI
Please send me complete information
My Name_____
Street_____
City_____ State_____

To Make and Sell Ornamental Concrete Items

You Need **MOLDS**

For Thorough Info
On Over 300
Different Molds
You Can Buy And
Use Plus Complete
Start To Finish
Professional Instructions

RUSH $2.00 for book

TURN CONCRETE INTO GOLD

CONCRETE MACHINERY COMPANY, INC.
839 Lenoir Rd. - P. O. Box 99 - Hickory 7, N. C.

Our Fabulous Choppers

[*Continued from page 83*]

each foot as he held the shuddering machine 50 feet above its landing pad at Ankhe.

At the touch of his fingers on a trigger in the stick, a cable unrolled from a winch under the helicopter's boom. A sergeant, staggering in the down-blast on the ground, hooked the cable onto a seven-ton bulldozer and the big helicopter rose smoothly into the air, its cargo dangling. Four minutes later, the bulldozer rested in a clearing on top of the mountain. It would have taken days to hack a path through the jungle and haul the machine up.

While these Flying Cranes are the wonders of the war in Vietnam, less spectacular helicopters are the real workhorses. When the U.S. 173rd Airborne Brigade had its combat baptism last June, helicopters flew the paratroopers into action, carrying eight-inch howitzers and ammunition with them. The howitzers are rolled into Sikorsky CH-37s; ammunition rides in slings beneath the craft. The twin-engined CH-37 accepts up to 6,800 pounds for lift within a 40-mile radius. Like the Flying Crane, it's widely used to recover downed aircraft.

Everywhere in Vietnam there are various Bell Aircraft Huey's, flown by the Army, Marines, and Air Force. Backbone of the Army is the UH-1B, powered by an 1,100-hp. Lycoming T53-L-11 engine. It seats 10, has maximum speed of 138 m.p.h., a range of 212 miles, and can carry 3,000 pounds of cargo. The Marines dub the same model the UH-1E. A larger version used by the Army is the UH-1D, powered by the same engine but seating 12 to 15 and with a range of 315 miles. The Air Force powers its UH-1F with a 1,272-hp. General Electric T58-3 engine. Its speed is the same as that for the other Hueys, but it can carry 11 passengers or 4,000 pounds of cargo nearly 400 miles.

The Hueys do everything. They carry armed soldiers, fly reconnaissance missions, haul supplies, and act as gunships. When used for firepower they have a four-man crew and are normally equipped with four outside machine guns and two rocket pods.

Huey pilots, called commander and pilot instead of pilot and copilot, have dual jobs. The commander, in the right-hand seat, flies the Huey and fires the rockets. The pilot's main job is to control and fire the outside guns, using a weird-looking mechanism called a "flex-gun" sight. The

Continued

FAST... EFFICIENT EASY TO OPERATE

NEW CLAMPING TOOL YOU CAN OPERATE WITH ONE HAND

CHANNELLOCK®

No. 910 GripLock

You'll like the easy-to-operate efficiency of this new **CHANNELLOCK** clamping tool. You can operate it with **ONE HAND** . . . easily, quickly, positively. No screw to adjust, a dandy portable vise for hundreds of jobs. Available in either straight or curved jaw . . . both in 10 inch size.

#910 Straight Jaw

#910C Curved Jaw

CHANNELLOCK, INC. MEADVILLE · PENNSYLVANIA

Copyrighted material

A New FREE BOOK for MEN PAST 40

Troubled With Getting Up Nights, Pains in Back, Hips, Legs, Nervousness, Tiredness.

This new Free Book tells that if you are a victim of the above symptoms, the trouble may be traceable to Glandular Inflammation . . . a condition that very commonly occurs in men of middle age or past and is often accompanied by despondency, emotional upset and other mental and nervous reactions.

The book explains that, although many people mistakenly think surgery is the only answer to Glandular Inflammation, there is now a non-surgical treatment available.

NON-SURGICAL TREATMENTS

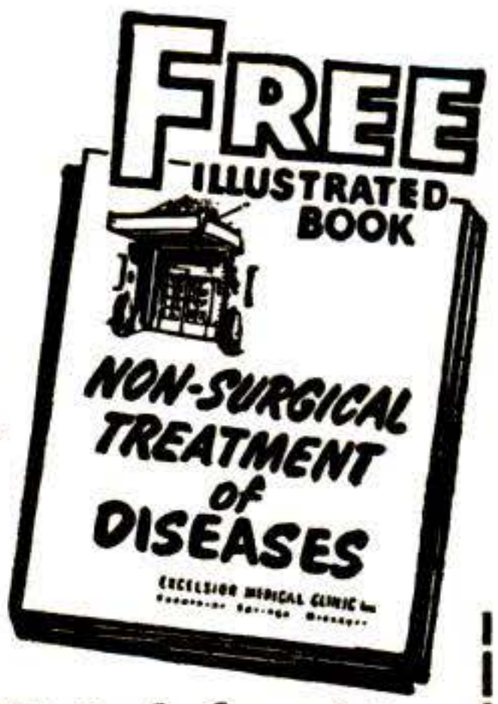
This New Free Illustrated Book tells about the modern, mild, Non-Surgical treatment for Glandular Inflammation and that the treatment is backed by a Lifetime Certificate of Assurance. Many men from all over the country have taken the NON-SURGICAL treatment and have reported it has proven effective.

The Non-Surgical treatment described in this book requires no painful surgery, hospitalization, anesthesia or long period of convalescence. Treatment takes but a short time and the cost is reasonable.

REDUCIBLE HERNIA | HEMORRHOIDS

Non-Surgical treatment for both Reducible Hernia and Hemorrhoids, the book explains, can usually be taken at the same time as treatment for Glandular Inflammation.

This new Free Book is fully illustrated and deals with diseases peculiar to men and women. It tells HOW and WHY New Modern NON-SURGICAL Methods are so successful today. Fill Out Coupon.



Excelsior Medical Clinic, Dept. M6256 Excelsior Springs, Mo.

Gentlemen: Kindly send me at once, your New FREE Book. I am interested in full information. (Please Check Box)

☐ Glandular Inflammation ☐ Hernia ☐ Hemorrhoids

Name.....

Address.....

City..... State.....

sight is basically a pistol grip like that on a .45 pistol and a slanted piece of glass with a blip at center. As long as blip and target are centered in the glass, accuracy is automatic.

"There is a maximum limit of flex for the machine guns," Marine Lt. A. J. Scaran explains. "They won't fire if flexed too far left, right, up, or down. If a target is at extreme left, the guns will traverse toward the target. The left guns will continue to fire, but the right guns will stop firing at a point short of the helicopter's front. This precludes the possibility of shooting at yourself. Also, the machine guns, which are controlled by an electrically actuated hydraulic system, will automatically stop firing in the rotor-blade danger zone."

A typical strike mission. Two gun teams (four Hueys), accompany unarmed transport helicopters into a landing zone. If there is ground fire, the Hueys respond with their rockets—which have 10-pound high-explosive heads—and machine guns, suppressing the enemy on the flanks of the area where the helicopters are to land. The tactics put two of the four Hueys on target. While two are on, two are swinging around, coming back ready to fire again. After the troops are on the ground, the gunships escort the unarmed troop-carrying helicopters back to base. It's not unusual for more than 100 choppers to fly in one operation.

One of the more dangerous missions helicopters engage in is the rescue of downed pilots. Recently an F-105 Thunderchief jet was shot down by enemy fire along the Song Be River. The pilot bailed out and landed safely, but surrounded by Vietcong. A Sikorsky HH rescue helicopter headed for the spot, with fighter-plane cover. Tracers were coming up from the ground as near as a quarter-mile from where the pilot was hiding. The rescue pilot, Capt. Bruce Hepp, spotted the downed pilot's orange-and-white parachute about the same time he began receiving a signal from an electronic homing beacon, part of the jet pilot's survival gear. The downed man also set off a signal flare. While all this was going on, the escort fighters were firing 20mm cannon shells into the area. As the rescue copter started down to make the pickup, the copilot, medic, and crew chief fired their M-16 rifles at the ground.

"We were receiving 50-caliber machine-gun and small-arms fire from about 50

Continued

Copyrighted material

And why not. If he's in business chances are he *got the jump* on his competition with his rugged economy DATSUN. For personal transportation the versatile DATSUN is fun to drive, easy to park. Carries up to 2,000 lbs. in its big 6 ft. bed (or camper top). 4-spd., full synchromesh, floor shift, powerful 1300cc engine, heater & defrosters, WSW tires, vinyl interior, torsion-bar suspension are all part of the delivered price of this terrific DATSUN Pickup.

$1,655 plus lic., tax, D & H.

See your Dealer for a test drive!

DATSUN

For information • write DATSUN Box 191, Gardena, California

Solves Repair Problems

Durham's fills cracks and holes in plaster, wood and tile. Won't shrink or fall out. Economical, easy to use. Big 4-lb can, only 1.60 at lumber, paint, and hardware dealers, or shipped direct postpaid in U S. for $2.00. Money-back guarantee Order now. Donald Durham Co., Box 804-U, Des Moines, Iowa.

Print Your Own

Cards, Stationery, Advertising, Circulars, labels, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too.

Own a Printing Business

Print for Others, Good Profit. Have home shop. Junior press $15; Senior $35up. We supply everything. Easy rules. Pays for self in short time. Write now for free details.

Kelsey EXCELSIOR Presses.

KELSEY PRESSES, Z-33, Meriden, Conn.

HOME WORKSHOP ARC WELDER!

ELECTRIC WELD BRAZE, SOLDER, CUT ALL METALS

New 1966 Model

LIFETIME BURNOUT GUARANTEE—10 day money back trial. Works on any 110 volt "Plug in". Welds up to 1/4" steel with 1/16" to 1/8" rods. **EXTRA** Special twin pressure type arc torch (shown) develops up to 10,000 deg. heat—**HAS A MILLION USES**—for **CARS—HOME—FARM—FACTORY.** No experience needed—FREE Welding book teaches **YOU.** Thousands of users. BETTER MADE—Easier to use than ANY OTHER similar welder. **SEND ONLY $2.00** (cash, Ck, MO) and pay postman $12.95 COD Pstg, or send $14.95 for postpaid delivery in USA. COMPLETE ready to use with 12 ft H.D. Cables, Arc torch rod holder, carbons, welding and brazing rods, flux solder, work clamp and full face mask. **FREE EXTRA** "Dark" eye goggles—if you order at once. This **BEST FOR THE MONEY** welder sold **ONLY** by MIDWAY WELDER, Dept. DPS-2, Kearney, Nebr.

FREE

WINDOW PLANNING IDEAS

to help you make your home more beautiful, more valuable. Send today for new, full-color folder packed with illustrated ideas and a complete description of the Andersen Window line.

(Clip and mail today!)

☐ I plan to build. PS-26

☐ I plan to remodel a _____.

Mr.
Mrs. _____

Address _____

City _____ State _____

Andersen Windowalls AW®
TRADEMARK OF ANDERSEN CORPORATION

Andersen Corporation • Bayport, Minnesota

Copyrighted material

yards behind and below as we settled down," said Captain Hepp. "It was impossible to move the chopper nearer than about 20 feet from the pilot's position. Our blades were clearing trees by five feet or less and undergrowth was brushing underneath us. The bamboo was almost 100 feet tall. We ran out 100 feet of hoist sling and pulled the pilot into our ship."

Copters get teeth. Helicopters in Vietnam are being better armed. Just coming into use is the XM21 system—two six-barrel Gatling-type machine guns, each able to fire up to 6,000 rounds per minute of the standard 7.62mm machine-gun round. These guns, modified versions of the GE 20mm guns used by the Air Force, are replacing the four M60 machine guns now widely used on Hueys. Helicopters with the new Gatling guns will also carry two seven-round rocket pods. The increase in firepower is formidable.

More effective missiles—like the Shillelagh—are also coming into use with the development of a stabilized sight system for copters that automatically feeds course-correction data to the missile from launch until it reaches the target. With this new system, the helicopter gunner needs only to hold the target in his sight while a computer guides the missile to the target.

Now the Army has ordered development of an armed helicopter that will fly twice as fast as any in combat. Top speed of those in use is about 150 m.p.h. Armed and loaded with weapons, including machine guns and rockets, the new Ayfuss (Advanced Aerial Fire Support System) helicopter would also be crammed with various radars, advanced communication gear, fire-control devices. Lockheed will develop the prototype—the Army's first copter built purely as a weapon carrier.

Bell Aircraft is slimming down its Hueys for more speed, too. New ones will fly at better than 200 m.p.h. And Boeing is modifying its CH-47A Chinook. More than a ton of armor plating is being added and more firepower is being installed. In addition to three forward-firing gun mounts, five manned gun positions are going into the cabin—one in the now unprotected rear.

In the war of the whirlybirds, these and other designs and concepts continue to underline the importance of the helicopter as the military's newest and most versatile battlefield tool. PS

THE BEST KNOWN IS KNOWN BEST

FOR REMOVING PAINT

SAVOGRAN COMPANY Since 1875 NORWOOD, MASSACHUSETTS

STRYPEEZE Semi-Paste is a non-benzol, general purpose paint remover, that clings to rounded or vertical surfaces.
STRYPEEZE Semi-Paste will not raise wood grains . . . is not harmful to natural fibers. Available where paint is sold.

QUALITY PRODUCTS SINCE 1875

SAVOGRAN

Addison, Ill. NORWOOD, MASSACHUSETTS Los Angeles, Cal.

BUILD YOUR OWN POWER TOOLS

METAL PARTS KITS AT LOW FACTORY DISCOUNT PRICES FOR:
- 10-IN. TILT/ARBOR SAW
- COMB. DRILL PRESS-LATHE
- 12-IN. BAND SAW
- 18-IN. BAND SAW
- 6-IN. BELT SANDER
- SPINDLE SHAPER

SAVE $50 OR MORE

PLANS Full Size Patterns $1.00 EACH DEDUCTIBLE

Kits from $15.50 to $39.95. Satisfaction guaranteed. Built and sold for 18 years. 45,000 units in use. Send for Plans today!

FREE CATALOG

GILLIOM MFG. CO. Dept. PS-2 St. Charles, Mo.

PROTECTS TOOLS, SORTS THEM NEATLY

HUOT TOOL CHEST

Keeps tools organized. 4 sliding drawers, rugged steel Professional Style cabinet—blue or red —26" x 12¼" x 12¼". Write for FREE BULLETIN on this and 15 other models.

HUOT MFG. CO. 597 N. WHEELER ST., ST. PAUL 4, MINNESOTA

MODEL 107

MAN-SIZE! NOT A TOY!

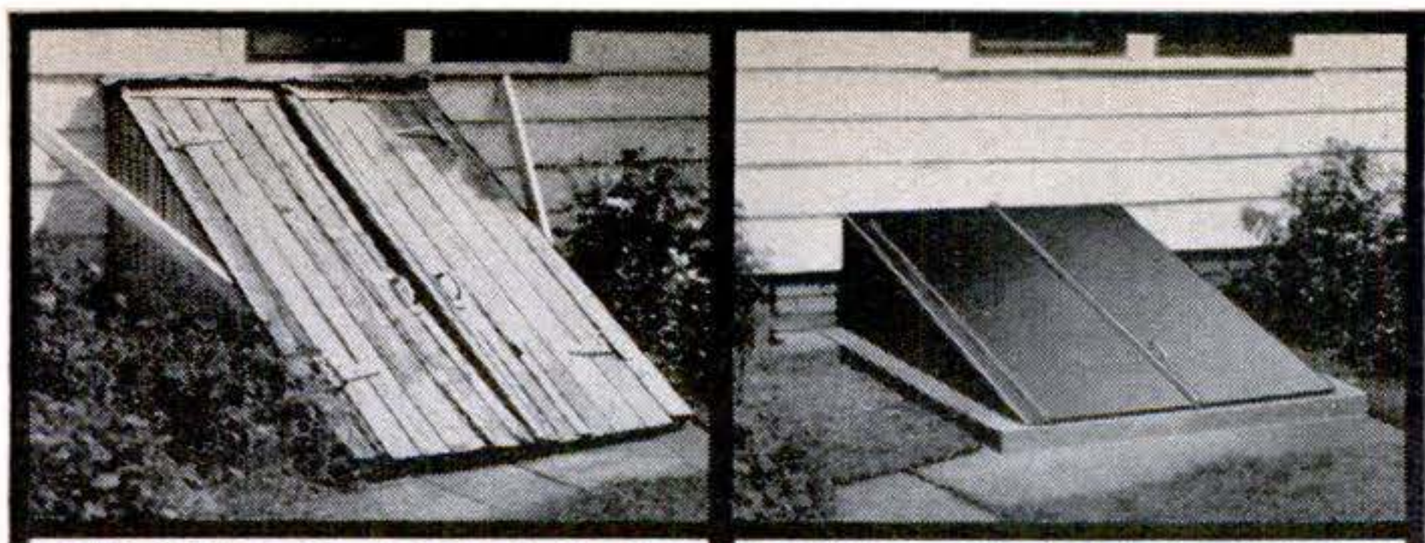
10 & 12 hp, all-gear drive

Mows lawn up to 60" swath ...handles tough jobs others can't. Sized for bigger tools, extra leg room. Automotive clutch, transmission, and differential — no belts. Implements for mowing, dozing, gardening, snow. Own the best, at modest cost! Write for catalog.

ECONOMY TRACTOR

1005 A-02 Anoka Ave. Waukesha, Wisconsin

Copyrighted material



EASY TO REPLACE THIS MODERN WAY

Bilco®

AMERICA'S FINEST BASEMENT DOOR

Here's the way to add amazing new beauty and convenience to your home. Replace that troublesome wood door with a modern Bilco. All steel, permanent, watertight, opens and closes at a touch. A new Bilco Door will do wonders for your home . . . and for you!

The Bilco Co., Dept. R-72, New Haven 5, Conn.
Please send me your free illustrated folder and name of local dealer.

Name_____

Address_____

City_____ Zone_____ State_____

NEW Improved Accurate **Scope-Shot**

SCOPE-SHOT COMPLETE WITH 50 DISINTEGRATING PELLETS They crack like a rifle when they hit—leave mark—puff of smoke! **$1.95 P.P.**

World's Finest Precision **SLINGSHOT** Scope-type sight!

ROUTS PESTS! Price without pellets **$1.50 P.P.** *Order Now!*

Big Bag of **250 EXTRA Pellets 98c P.P.**

Millions Sold! Patent No. D-178,837

Pure gum rubber slings. Beautifully polished cast aluminum stock. Pistol grip. So powerful it kills small game. Fits pocket perfectly! Guaranteed. **FREE** shooting manual.

EXTRA RUBBER SLINGS, 4 pairs $1.00 p.p. Leather Pouch & Sling assembly only 40c p.p. Order NOW from:

GENERAL SPORTS
4184-PB Apple St., Cincinnati, Ohio 45223

NEW TEAR GAS PENCIL

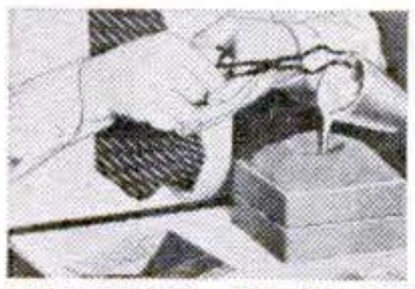
100% PERSONAL PROTECTION

Stop thugs and attackers instantly with Hagen's Tear Gas Pencil. Sells easy to Drive-ins, Stores, Homes, Nurses, Motorists, Night Workers. New big demand. No selling experience needed. Start now! Send $5.95 for complete Demonstration Kit of Tear Gas Pencil, 10 Demonstration Caps and 3 Tear Gas Cartridges.

Not sold to minors, nor in Mich., N.Y., Calif., Wis. State age with order.

HAGEN SUPPLY CORP., DEPT. P-26, ST. PAUL, MINN. 55101

BRONZE FOUNDRY



Since 1935

Schools • Home Workshops, Inventors

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in six sizes, capacity 1½ lb. to 48 lb. of red brass. 2400 Deg. F. blast furnace included with each. Write for Free Circular.

KANSAS CITY SPECIALTIES CO. Dept. S-2 P.O. Box 193 Middleton, Wisconsin

---

BASEMENT TOILET FLUSHES UP

TO OVERHEAD SEWER OR SEPTIC TANK.

NO DIGGING UP FLOORS. Write

McPHERSON, INC. BOX 15133 TAMPA, FLA.

---

8 times more power to relieve pain of

HEMORRHOIDS!

Soothing Nupercainal concentrates on pain! Prolonged relief of pain, burning and itching starts in minutes.

If you suffer from the misery of hemorrhoids, remember this about remedies you can buy for temporary relief. The leading "shrinking" preparation contains no anesthetic to relieve pain.

No wonder so many doctors recommend Nupercainal. Soothing Nupercainal relieves pain, itching, burning fast...gives prolonged relief...because it has *over eight times more pain-killing power* than the other most commonly-used topical anesthetic!

Nupercainal quickly puts raw nerve ends to sleep...thus puts pain to sleep. Lets you go about your business...relieved of the pain, burning and itching torment of hemorrhoids. Get Nupercainal Suppositories today—with free, handy pocket-pack. Start to live again, in comfort! (Ointment also available.)

Nupercainal®

Money Back Guarantee — HEAVY DUTY-ARC WELDER — Five Year Guarantee

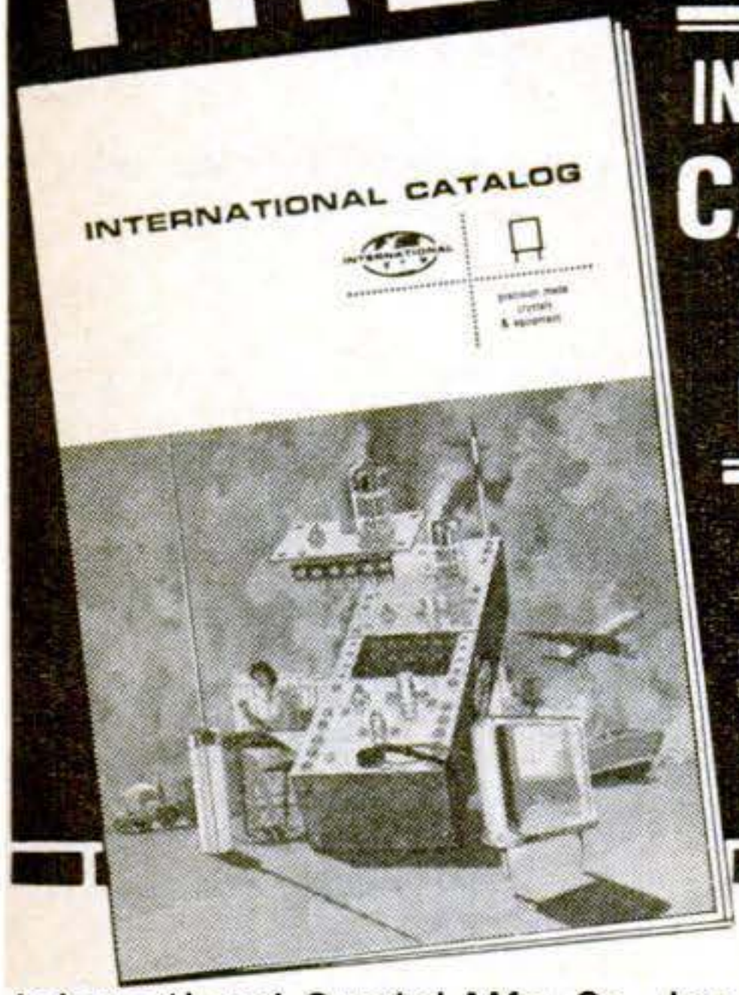
The New 1966 Model Heavy Duty 110 Volt Arc Welder works on any 110 volt house line. You can not buy a better welder anywhere at this low price. No experience necessary. Now anyone can braze, solder, and weld any metal up to ¼" thick. Generates heat up to 10,000 degrees for cutting through steel plate, etc. **NOTHING ELSE TO BUY.** Comes complete with 12 ft. of heavy duty power cable. 1/16" and ⅛" welding and brazing rods, rod holder, twin Carbon torch, helmet, instruction book, etc. **MONEY BACK GUARANTEE.** Try it for 10 days. If you are not completely satisfied we will immediately refund your money without question.—**FULLY GUARANTEED FOR FIVE YEARS.** If inoperative, we will repair or replace it free of charge. **SEND ONLY $2.00,** and when delivered, pay postman $12.95 plus COD postage, or send $14.95 and we will ship postpaid. Over 10,000 National Electric welders are in use throughout the world. (For an extra large supply of rods, carbons, and flux, send an additional $2.00.)

Order direct from factory: NATIONAL ELECTRIC, Dept. PS-2, DELRAY, FLORIDA

ONLY $14.95

Copyrighted material

FREE!...



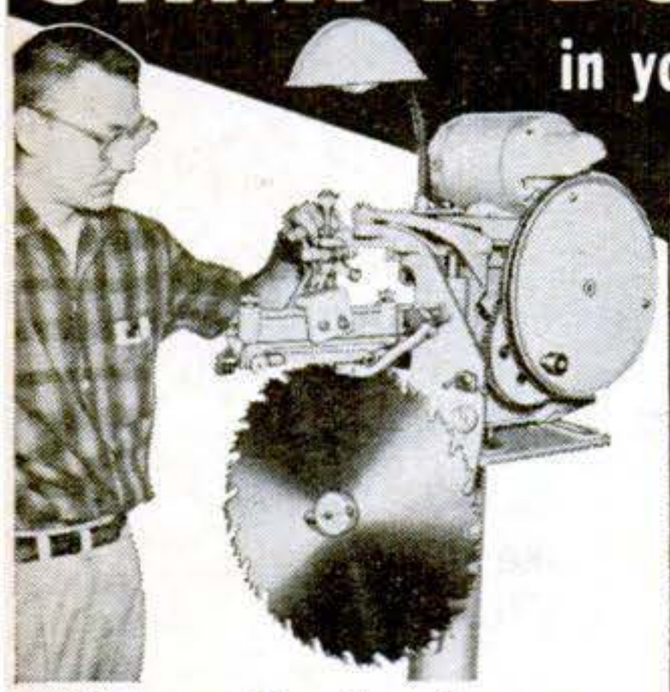
INTERNATIONAL CATALOG
your 1966 buying guide

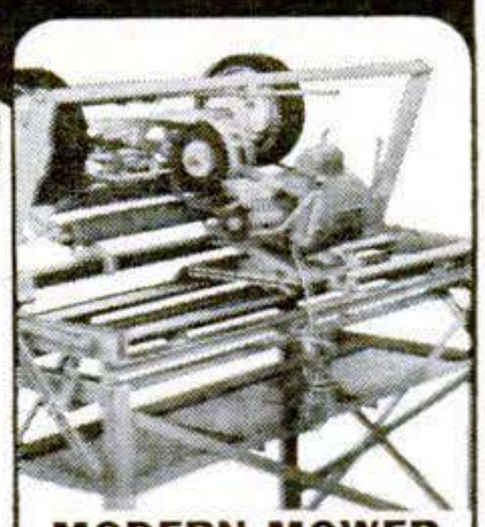
FOR PRECISION MADE RADIO CRYSTALS AND ELECTRONIC EQUIPMENT

International Crystal Mfg. Co., Inc.
18 No. Lee, Okla. City, Okla. 73102
Rush Free Catalog

Name_____
Please Print
Address_____
City_____ State_____ Zip_____

START A BUSINESS
in your neighborhood





Sharpen Hand or Power Saw with the

FOLEY SAW FILER

MODERN MOWER SHARPENER
Precision-grind all hand and power lawn mowers—a perfect job every time.

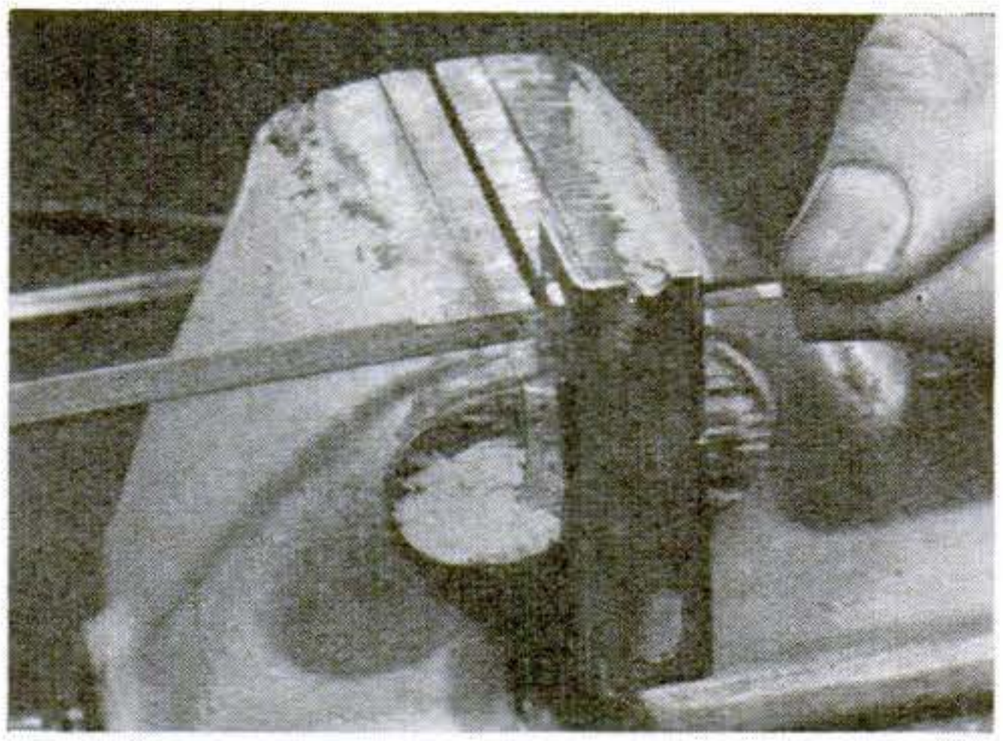
Start your business in sparetime and make CASH PROFITS right away. No stock to carry, no selling involved, no experience needed —the Foley Saw Filer does every sharpening job **automatically!** Earn $3 to $6 an hour sparetime in your own garage or basement. Profit 90c on every dollar.

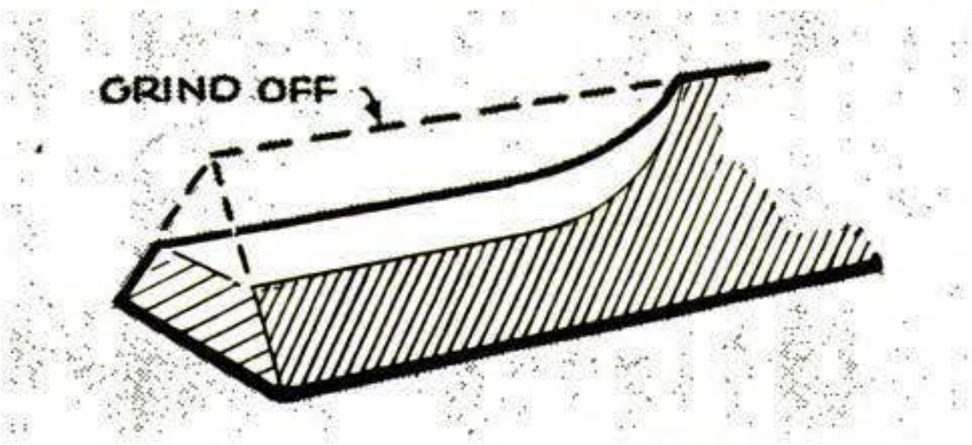
Best of all, every saw you sharpen, will be resharpened again and again—watch your repeat business grow! Add cash to your income now, while you build retirement security with the Foley Saw Filer.

FREE BOOK shows how you can make money as thousands of others have. Send coupon today. There's no obligation, and no salesman will call—so write today!

Foley Manufacturing Co.
249-6 Foley Bldg., Minneapolis, Minn. 55418
Send for FREE book on Money-Making facts about the sharpening business.

NAME_____
ADDRESS_____
CITY_____ STATE_____ ZIP CODE_____

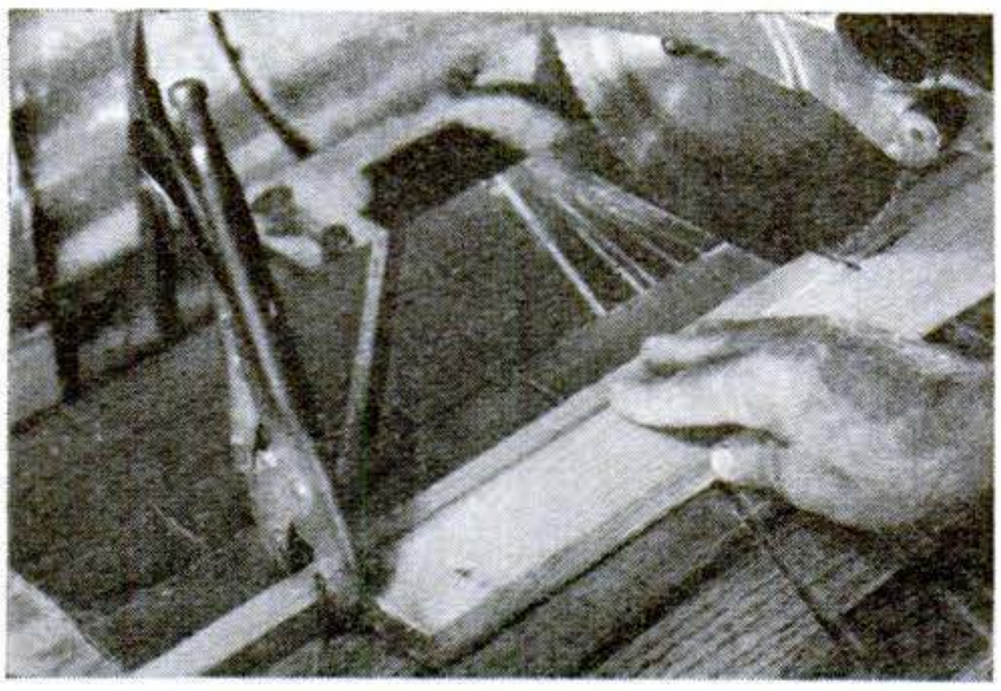




Ground-down file for narrow slots

To smooth a narrow slot that is too small for any of the files you have at hand, try adapting a triangular file to the job. Grind off one edge (corner) and extend the ground section a few inches back from the tip. File with care, though—especially if the ground-down part of the file is thin—to avoid breaking the tool.

WALTER BURTON, Akron, Ohio.

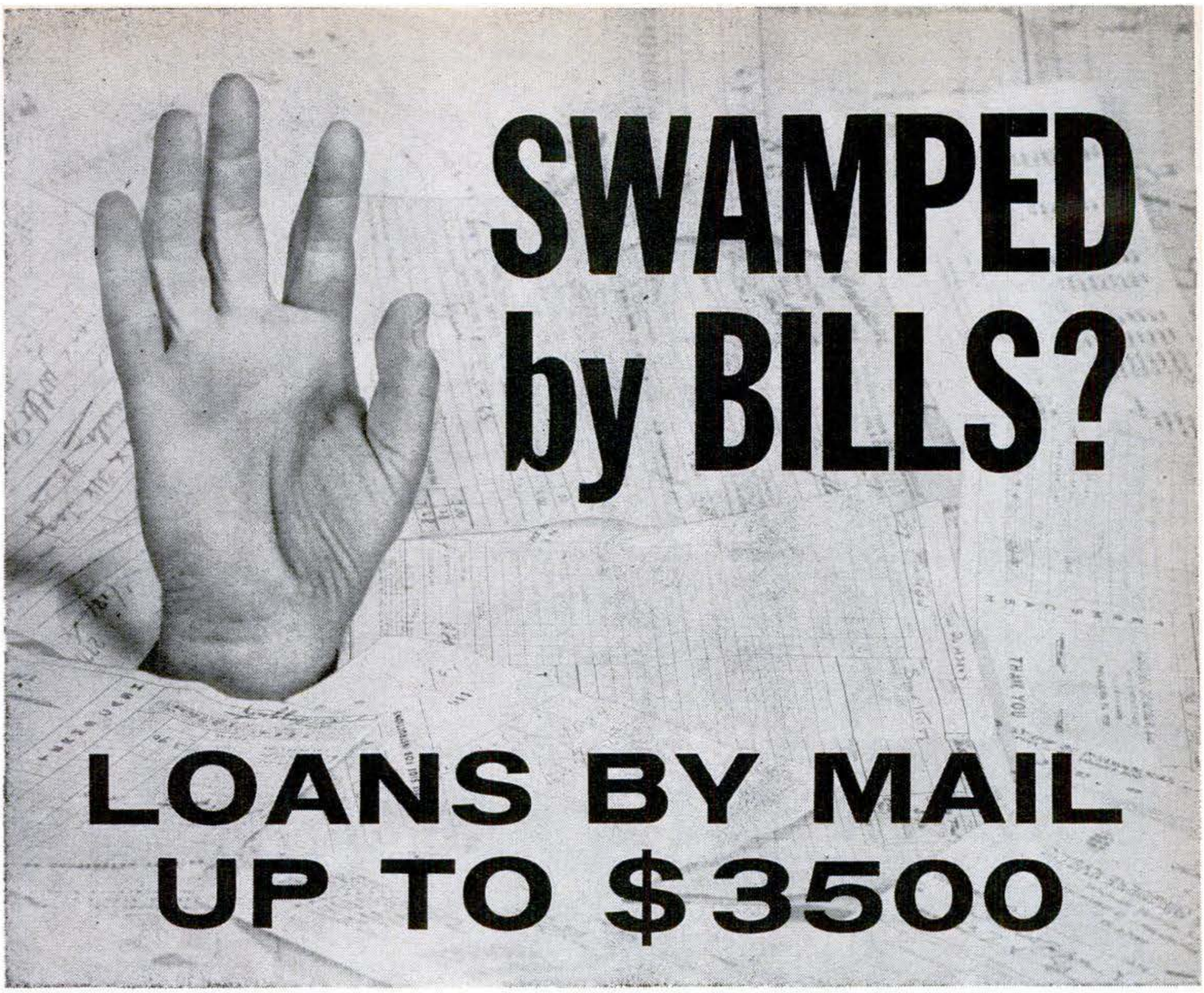


Vise grips make a good saw stop

Vise-grip pliers make a handy, dependable saw stop when you have to cut a number of pieces the same length with a radial-arm saw. They snap on the fence with one hand and work out so well that the inexpensive ($1) pair I first used for the purpose never leave the saw.

FRANK MORRISON, Tampa, Fla.

Copyrighted material



Home-Owners! Borrow direct at Consumer Discount Co. rates. FAST! CONFIDENTIAL! COMBINE YOUR BILLS IN ONE LOWER MONTHLY PAYMENT!

No middlemen, no brokers, no fees or commissions. You borrow direct from a major company that's licensed by the Penna. Dept. of Banking. You may get the money you need to pay off all your debts, even have extra cash besides — take up to 4 years to pay — and probably cut your present monthly payments ⅓ to ½. No co-signers, no embarrassing investigations. Repayments tailored to your personal situation. You are treated like a valued customer. Send coupon today — get details by immediate return mail in plain envelope.

FOR HOME-OWNERS ONLY!

In states where permitted.

CASH YOU GET	REPAY MONTHLY (48 months)
$3449.72	$102.41
2009.88	59.00
1220.52	36.00
1014.60	30.00

Comparable payments on other size loans.

INSURANCE AVAILABLE,
not included in above schedule.

RUSH COUPON NOW!

OXFORD CONSUMER DISCOUNT COMPANY
6701 N. Broad Street, Philadelphia, Pa. 19126

G-PS2

I am a homeowner.
Please rush details on Loan-by-Mail Plan.

Name _____

Address _____

City _____ State _____

Phone _____ Amount Needed $ _____ Age _____

Copyrighted material

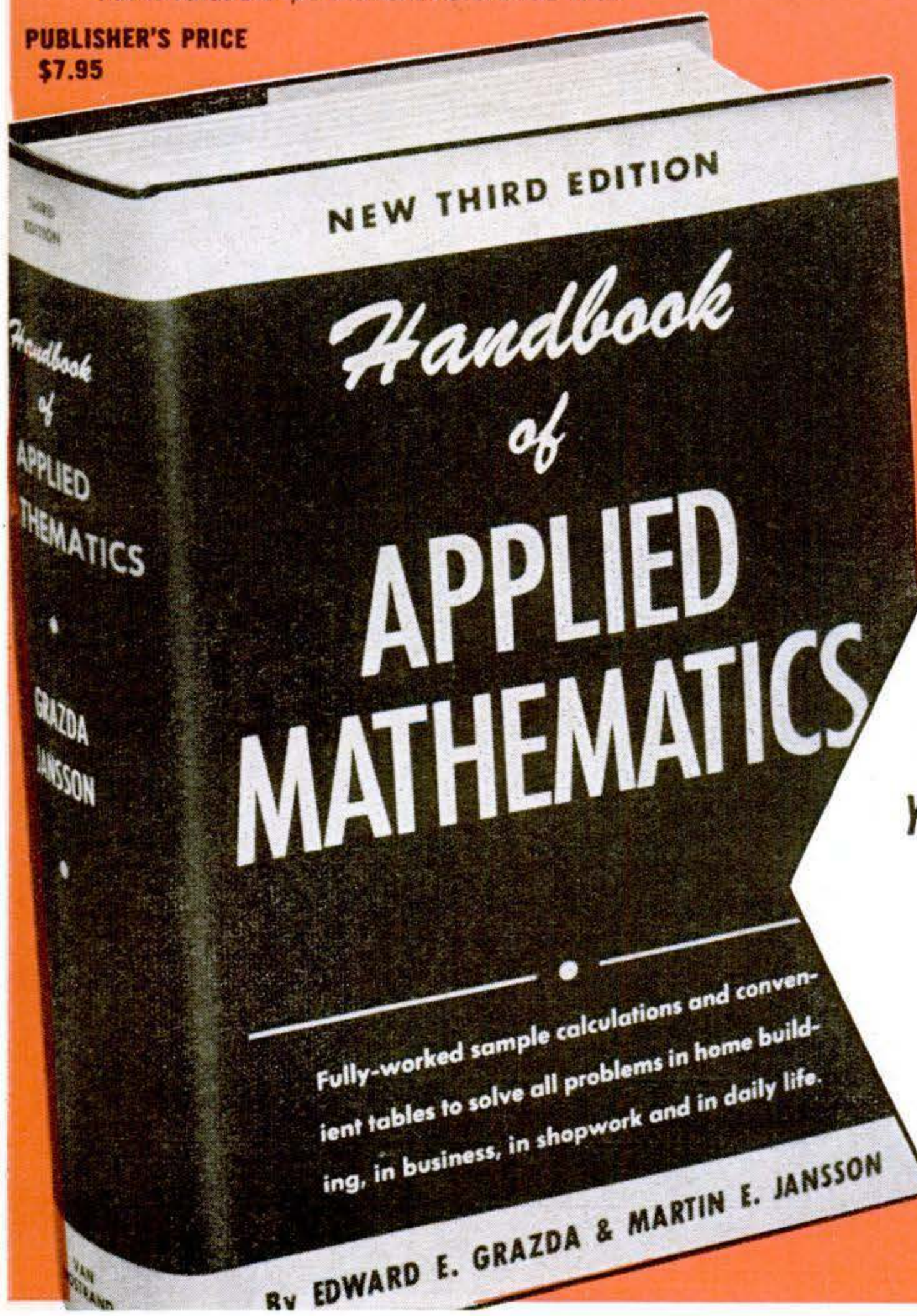
Get both these fine library volumes...

HANDBOOK OF APPLIED MATHEMATICS

by Edward E. Grazda & Martin E. Jansson

Here's the heavyweight champion of *useful* books on math! 1,044 pages and over 1,000 drawings, photos, tables on every kind of practical problem-solving for hobbies, workshop projects, electrical repair, home improvement, machine work —wherever your active interests lead you! Everything on carpentry and construction, from how to figure lumber footage to calculating rise and run for stairs. All about building foundations, concrete, brickwork, lathing and plastering. Complete chapters on plumbing, heating, ventilating and air conditioning. Nearly 200 pages on electrical and electronics math alone! Chapters on printing, business math, accounting. PLUS special sections on practical algebra, geometry, trigonometry, calculus, and theory of mechanics. All with fully worked examples and a wealth of helpful illustrations. An invaluable permanent reference tool!

PUBLISHER'S PRICE $7.95



CHECK THESE UNIQUE ADVANTAGES OF PSBC MEMBERSHIP:

- **You choose from the broadest range of titles on practical and technical subjects!** All the finest books on Science, Mathematics, Cars, Home Workshop, Mechanics, History of Science, How Thinks Work, Engineering, Electronics, Astronomy, Home Improvement—all your favorite subjects!
- **You save up to 50% and more on every Club selection!** PSBC books are priced way below the bookstores for the identical Publishers' Editions.
- **You buy as many or as few books as you please!** To retain full membership benefits **you need purchase only one more Club selection** (after your first selection) for the **entire year.**
- **Free 10-day trial examination of every book you choose!** All selections are fully returnable **after** you have decided. Absolutely no obligation on your part.

POPULAR SCIENCE BOOK CLUB
355 Lexington Ave.,
New York, N.Y. 10017

This $7.95 Premium book

YOURS FREE!.....

1,044 pages of practical math know-how bulging with over 1,000 illustrations

MAIL ATTACHED

Copyrighted material

... $13.90 worth of books for only $3.45!

SCIENCE THE NEVER-ENDING QUEST
by William C. Vergara

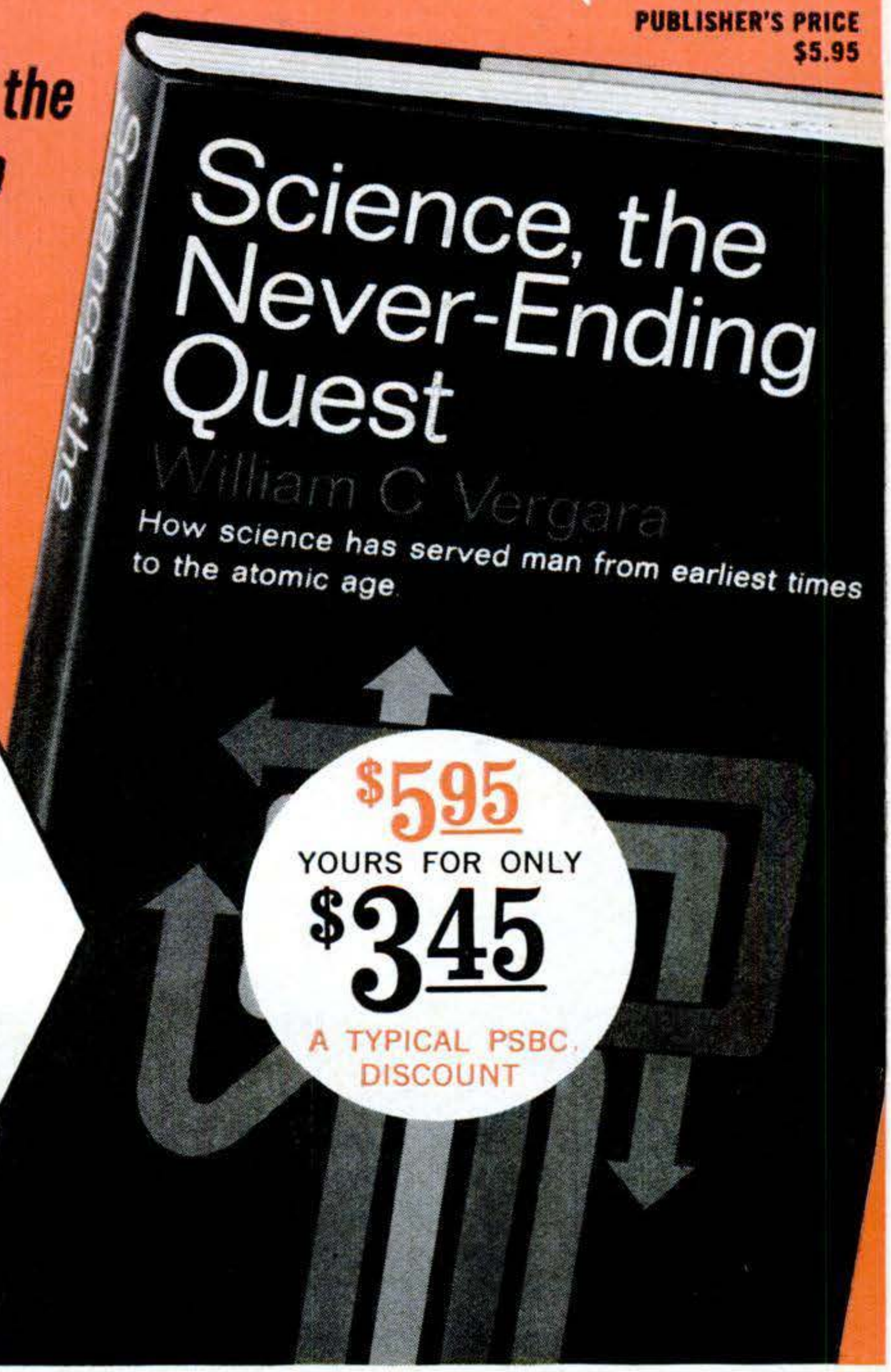
From Archimedes to Niels Bohr. From Carthaginian navigation to the invention of the steam engine. From the principle of the lever to the astonishing laws of quantum mechanics — here is the whole fascinating story of great men and ideas of science through the ages. SCIENCE THE NEVER-ENDING QUEST not only *explains* the laws, theories, and discoveries — in the study of sound, motion, light, electricity, nuclear structure — it actually *recreates* the steps in thought and experiment that brought them about! You step inside the minds of men like Galileo, Kepler, Newton, Mendeleev, Maxwell, through all the modern titans: Planck, Rutherford, the Curies, Einstein, Heisenberg. In fascinating detail, without complicated math, you learn about the ideas of science in relation to one another and in competition — often violent — with the ideas they replaced. A marvelous book both for solid information *and* pure reading enjoyment. With clearly detailed diagrams of scientific concepts, principles, and their applications.

EXTRA!

Free Surprise Gift with every book! Here's a unique plus for PSBC members. With every selection you accept there's a mystery bonus comes with it. A special compact tool? Science gadget? Wall chart? Vestpocket guide? — always a surprise and always fun!

PUBLISHER'S PRICE $5.95

Start right now enjoying the widest possible selection of worthwhile books
(at incredible discounts)
As a joining member of the Popular Science Book Club!



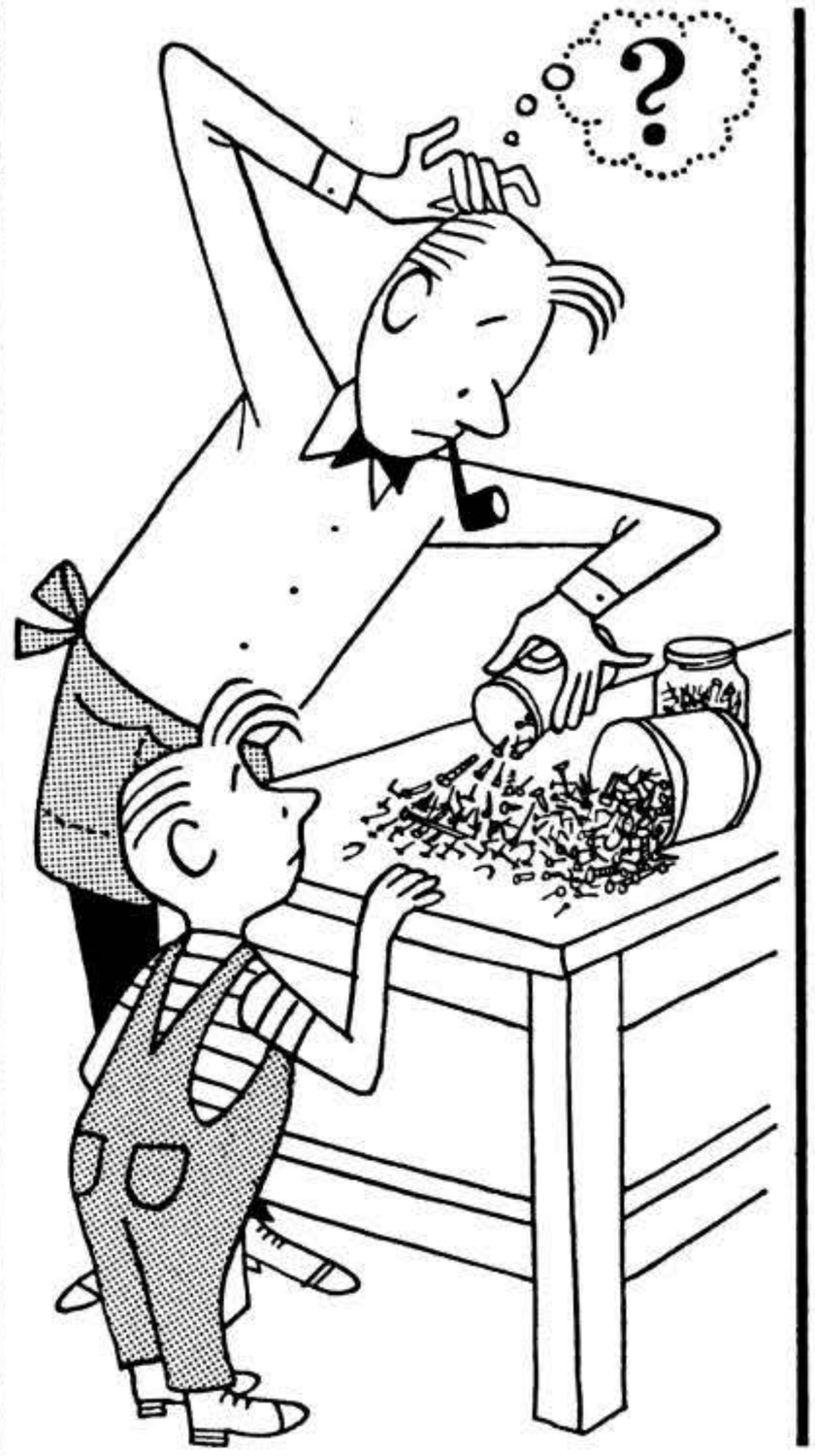
And as your 1st Club Selection this fabulous chronicle of the exact sciences. 434 pages, 17 chapters, 155 detailed drawings.

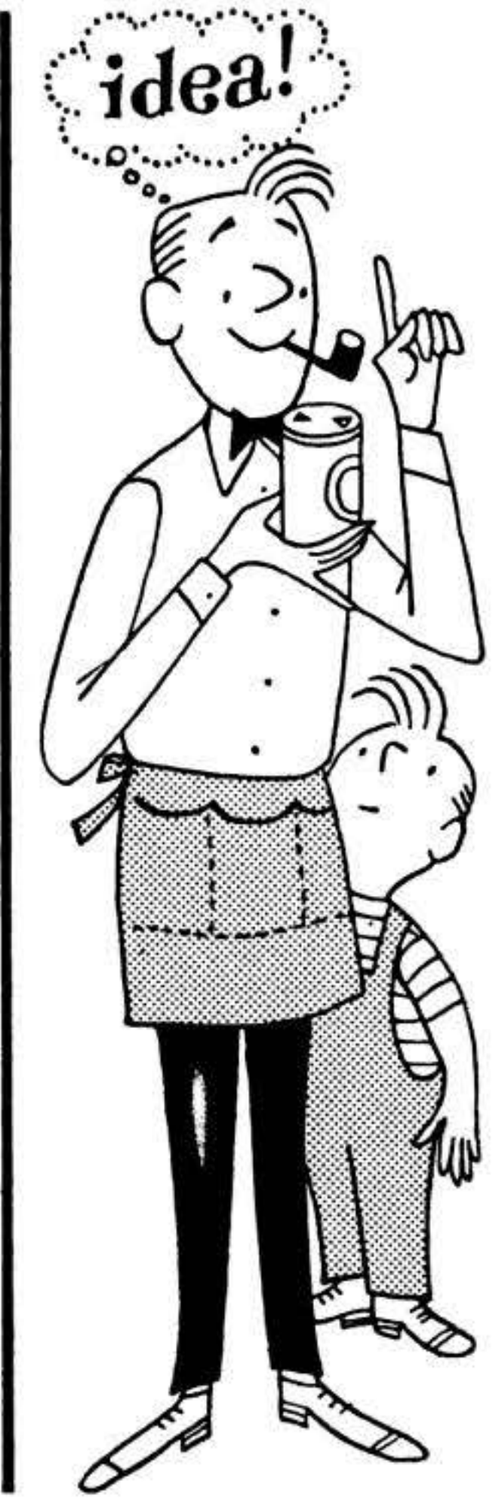
CARD TODAY!

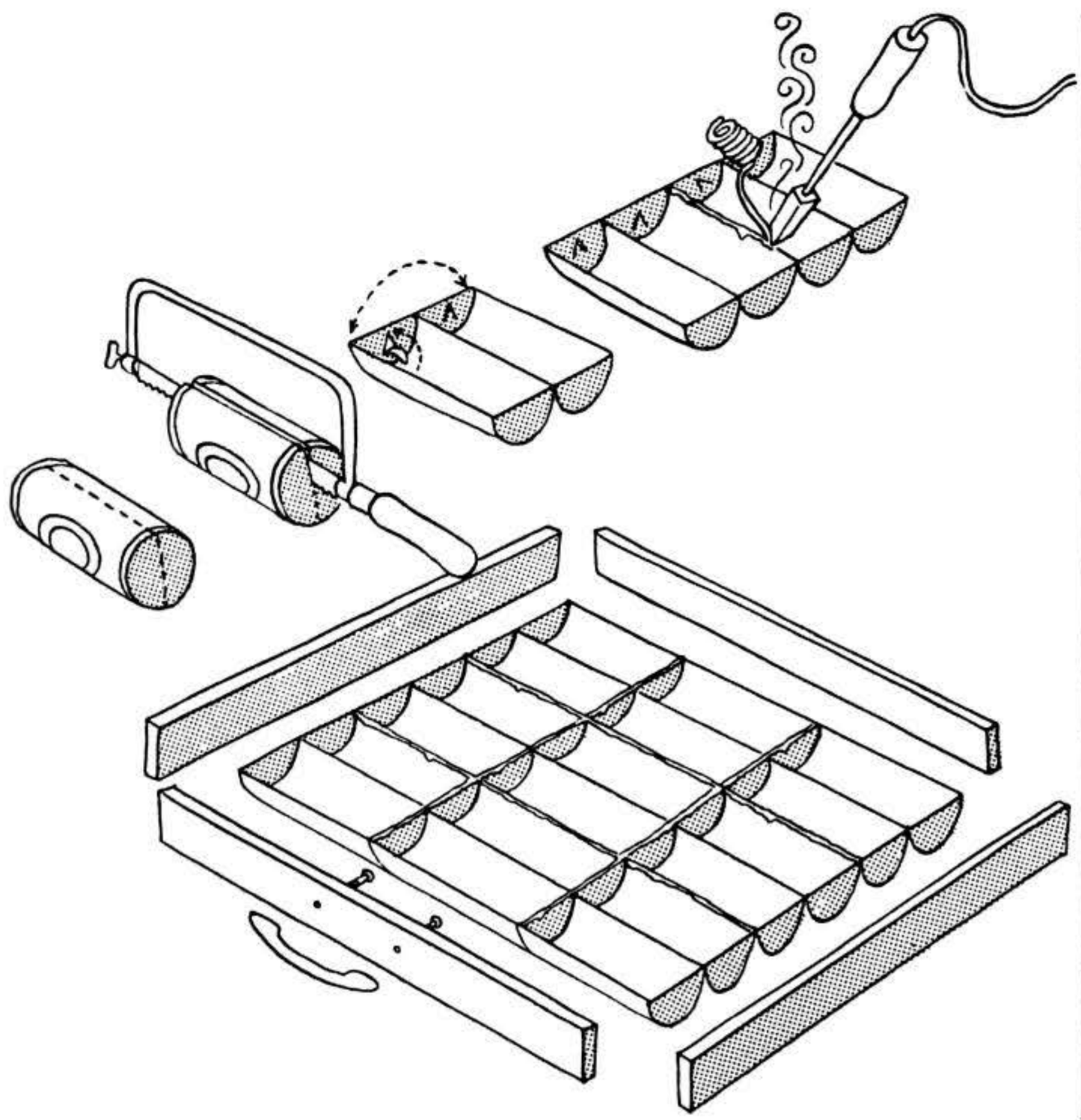
Copyrighted material

Wordless Workshop

By ROY DOTY



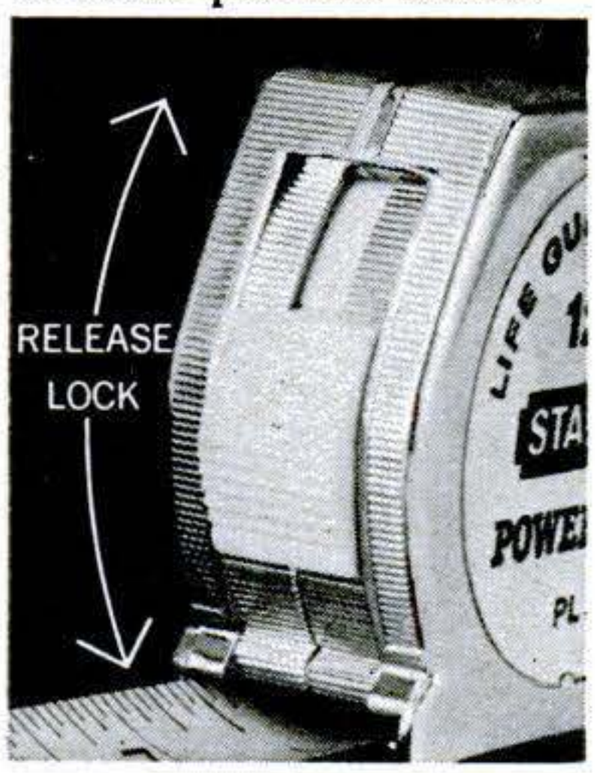




Copyrighted material

Stanley rules the world.

The new Stanley POWERLOCK™ tape rule reigns supreme. This power return rule locks the blade so it can't "creep" while you take measurements. This not only prevents mistakes. It could prevent ulcers.



You'll find it's a bit easier to measure things with this rule, too. The knob that locks the blade in place is positioned to let you measure and lock with one hand — while you jot down dimensions with your other hand.

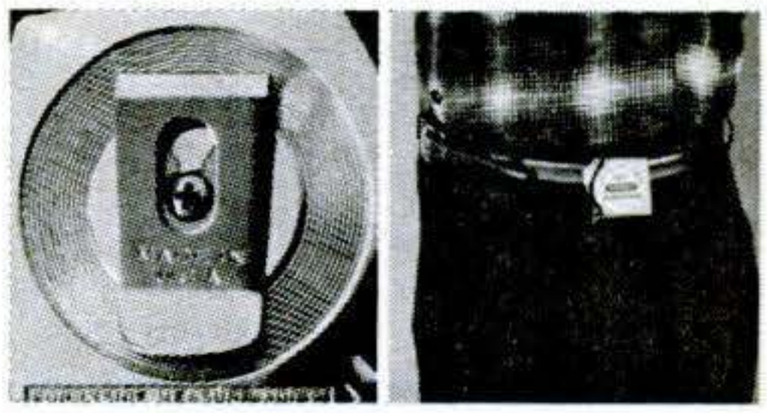
The bold, black numerals, contrasted against the yellow background, make Stanley's POWERLOCK easier to read than other power return rules. (Why else would they make traffic signs yellow and black?)

And those numerals aren't going to wear off with use. The blade is coated with Mylar (DuPont's trademark for its Polyester film). In fact, the numerals and graduations last up to ten times longer than the ones on ordinary power return rules.

When you get a rule this good, you never want to lose it. That's why the Stanley POWERLOCK comes with a clip that grips securely

BLADE CLAD WITH MYLAR

to your belt. What width do you prefer? The ½″ blade comes in 6, 8, 10, and 12 ft. lengths. We also have a ¾″ blade in 10 and 12 ft. lengths. And as a rule you'll find them all with your Stanley supplier.



We think this is by far the best rule you can buy — no matter how you measure it. Stanley Tools, Division of The Stanley Works, New Britain, Conn.

STANLEY®
helps you do things right

Copyrighted material

[Continued from page 94]

of the Rockies to another. By this spring, a half-dozen major links now being thrown across the mountains should have combined the two giant pools into one.

Grids save money for power companies and their customers. Some engineers estimate that power costs would be more than doubled if every company were on its own. And grids *do* prevent blackouts. For every November 9, there are hundreds of emergencies where the pools keep lights on.

But the grids also bring a new kind of vulnerability. "Whenever you interconnect in any large system," says W. J. Kelley, vice-president of Illinois Power Co., "a by-product is the possibility of cascading power failures." Exhibit No. I: November 9. The place: CANUSE—the Canada-U.S. grid that covers southern Canada and the northeastern U.S.

Visualize CANUSE as a huge tree. Its main trunk is a 345-kilovolt (kv) transmission line—massive two-inch-thick aluminum cables strung on 1,000-foot towers. It starts at the giant hydroelectric plants near Niagara Falls and stretches more than 400 miles to New York City. Along the trunk are its branches, smaller 230-kv, and 138-kv transmission lines. And in the branches of this electrical tree nestle six major power companies and generating facilities and a handful of smaller ones. Major branches spread into New England, jab into Canada.

The beginning. The trouble began when a relay in the Sir Adam Beck No. 2 station in Ontario—one member of the pool—snapped shut and gave the tree a mighty shake. The shudder rippled down the tree, shaking power plants off. Here's how it happened.

At 5:16 p.m. on Nov. 9, 1965, the 15 huge generators in the Beck plant were sending their power north toward Toronto along five giant 230-kv transmission lines. Each of the lines was carrying 350 megawatts (million watts) of power. But their overload relays were set at just 375 megawatts—a very narrow safety margin.

Eleven seconds later, a surge on one line raised the momentary flow above 375. The line tripped out, automatically transferring its load to the other four. Each of these, now overloaded, tripped in turn. Toronto, cut off, went black. The generators, though, were still spinning. But the power meant for Toronto had only one place to go: surging across the river into New York.

Generators in a pool must run in synchronism. If any generator begins to drift out of step with the others—to run faster or slower than the standard 60-cycle system frequency—the governor feeds more or less fuel to the boiler to get it back into step.

The surge of energy made the generators of stations near Niagara Falls begin to race. Protective relays blew like popcorn. At 5:17, Rochester and Buffalo went dark.

By now, relays at Beck closed and the surge was spent. But western New York was dark. Utilities in the eastern part of the state and New England, relatively unaffected, began trying to fill the void.

Holding on. Their generators strained; systems operators, hanging on beyond the point where they could help, gritted their teeth, poured on the coal, and held on.

Gradually, the laboring CANUSE stations were going down with the drowning man they were trying to save. At 5:19, Orange and Rockland counties north of New York City went dark. Boston fell at 5:21. Finally, New York's giant Consolidated Edison stood alone. Edward Nellis, sitting at the helm of the company's master control station, watched the wildly fluctuating needles and made the same decision as all the rest: Hold.

His generators, now trying to light the entire state and most of New England alone, began to drop in frequency. Automatic governors turned on more oil to get steam up. But the sagging voltage crippled the oil pumps, too. Finally, Nellis decided he couldn't make it and punched the eight buttons that would operate eight giant circuit breakers north of New York and chop the city lose from CANUSE.

And finally, New York. But Nellis had waited too long. Or, as the Federal Power Commission put it after an investigation, he "did not make an immediate clean-cut decision in this emergency."

The result: "The system collapsed," said J. Eliot McCormack, a company vice-president, "and the Edison Company was down cold." So was the rest of the state and most of New England. It was 5:28.

What to do about this house-of-cards effect is, of course, the problem. How do you keep local failures from becoming wide-ranging catastrophes?

Copyrighted material

Blackout: Can It Happen In Your Town?

FPC medicine. The Federal Power Commission recommended several major changes. Among them:

- A greater willingness to douse the lights in an emergency. A company in trouble should cut service to its customers fast and isolate the trouble; then, with the help of surrounding pool members, bring unaffected parts of its system back into operation.
- Less of the grit-your-teeth-and-hang-on philosophy between pool members. Systems operators should be given orders to help if possible, but cut loose from neighbors in trouble before their own systems go down. Or automatic equipment should be installed to do it for them.
- Overall defense strategies and system standards. Pools, which grew up haphazardly, have had little overall planning. Each company makes its own decisions about how to set its relays and what to do in an emergency. They don't always work well together.
- Greater emergency reserves—"spinning reserves," turning lightly loaded generators that can pick up large loads rapidly.
- Stronger inter-ties. If more companies, including those far away, had been able to share the strain of the original emergency, the total collapse might never have happened. (Some parts of the country already have stronger ties than those in the CANUSE area and are therefore less vulnerable.)

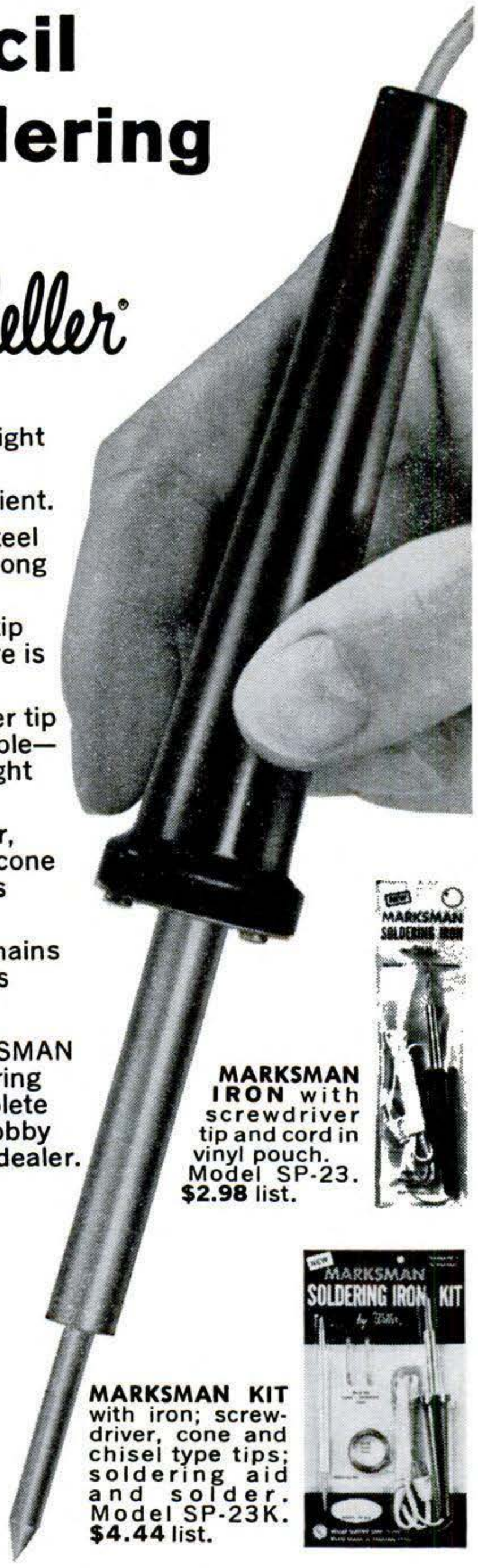
How safe will the northeast—or your part of the country—be from now on? Obviously, there's little change so far. On Dec. 6, a similar cascading failure knocked out power in east Texas. For the future, the FPC has made its impressive recommendations. But it's questionable how widely they'll be applied. After all, we haven't really learned anything new. Power engineers knew cascading blackouts could happen; they've happened before. And they've recommended changes before, too. Following the Midwest failures, for example, investigators came to essentially the same conclusion the FPC reached in December.

As a result of the recent blackout, the FPC has indicated that it will push for new laws regulating pools and inter-ties, not simply make suggestions.

Can a blackout happen in your town? Well, there's less chance of it now than there was a few months ago. But don't throw away your candles. PS

Brand new leader in value and features!

MARKSMAN Pencil Soldering Iron by Weller®



- Extremely light in weight.
- Highly efficient.
- Stainless steel barrel has long reach.
- Maximum tip temperature is 750°F.
- ⅛" diameter tip is replaceable—gets into tight places.
- Screwdriver, chisel and cone shaped tips available.
- Handle remains cool, resists breakage.

Get a MARKSMAN Pencil Soldering Iron or complete kit at your hobby or hardware dealer.

MARKSMAN IRON with screwdriver tip and cord in vinyl pouch. Model SP-23. **$2.98** list.

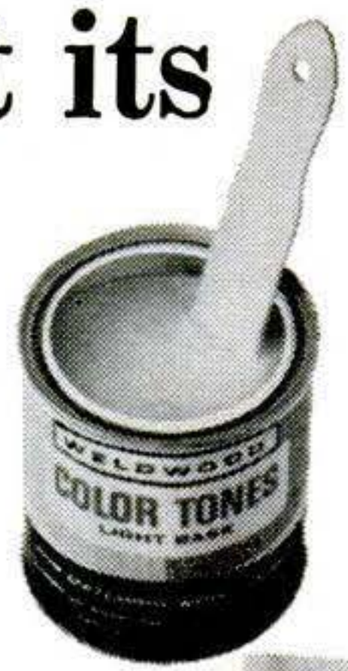
MARKSMAN KIT with iron; screwdriver, cone and chisel type tips; soldering aid and solder. Model SP-23K. **$4.44** list.

WELLER ELECTRIC CORP., Easton, Pa.

WORLD LEADER IN SOLDERING TECHNOLOGY

Copyrighted material

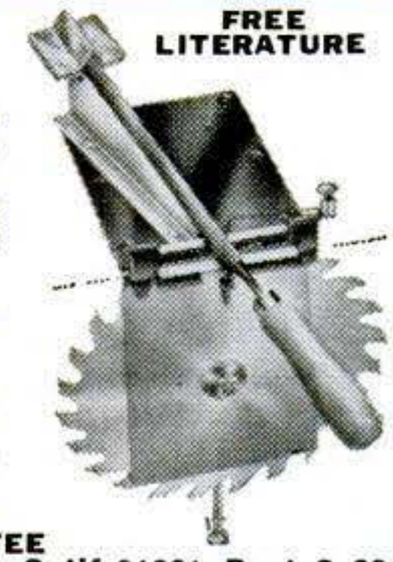
Now every wood can meet its match.



Want to color-match trim to wood paneling? Trim to doors? Doors to furniture? You've got to have the system. The Weldwood® Color Tones® system.
No guesswork. No measuring. Just a Color Tones base, plus a packaged colorant, is all it takes. Color chips make it quick, easy to match 138 shades for the wood tone you want.
U. S. Plywood Corporation, 2305 Superior Avenue, Kalamazoo, Michigan.

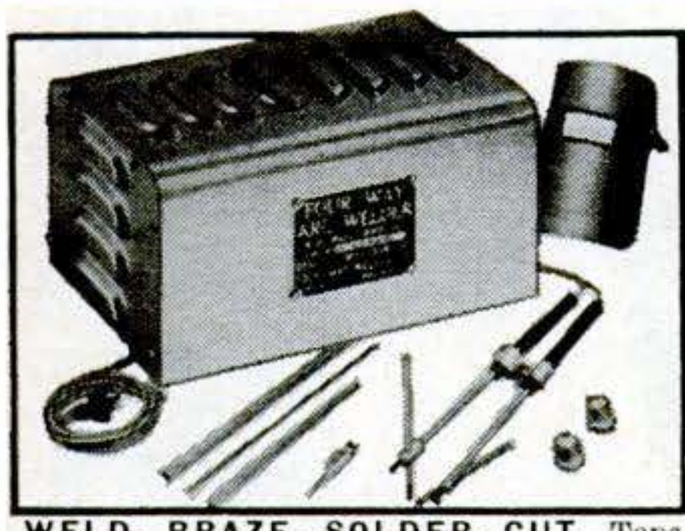
SAW SHARPENING IS EASY

Super Filer No. 11 joints and sharpens circular saws 6" to 10" with all teeth correct in height, depth, pitch, bevel. When file hits steel roller, teeth are finished. Saw runs true with no side pull. Includes 8" file. **$9.95 PPD.**



"TRU-CIRCLE" saw set automatically sets teeth at 10° or more. **$2.95 PPD.**

MONEY BACK GUARANTEE
A. D. McBURNEY, 1610 Victory Blvd., Glendale, Calif. 91201. Dept. S-26



FOUR-WAY BEST LOW COST ARC WELDER YOU CAN BUY only $14.95 Complete

WELD, BRAZE, SOLDER, CUT. Tops in performance and value. Ideal gift, educational, profitable, enjoyable. No experience needed. Use ⅛" welding rods and ¼" carbons to make or repair auto bodies, fenders, trailers, boats, toys, furniture, farm equipment; garden tools, anything of metal. Operates on 110 V. line. **WORLD'S GREATEST WELDING VALUE.** Over 500,000 in use by home owners, farmers, hobbyists, mechanics. **5-Year Unconditional Guarantee.** If inoperative will repair or replace without charge. **You Get: FULL FACE SHIELD,** heavy metal cabinet, ground clamp, 12 ft. of heavy duty welding cables, twin carbon arc torch, rod holder, carbons, welding and brazing rods, flux, solder, instructions. Order on 10-DAY UNCONDITIONAL MONEY BACK TRIAL.

SEND ONLY $2.00 and pay $12.95 plus C.O.D. charges on delivery, or send only $14.95 and we will ship prepaid. Order today.

FOUR-WAY WELDER CO. DEPT. W3-B 1810 S. FEDERAL ST. CHICAGO, ILL. 60616

Practicing a Moon Landing on Earth

[Continued from page 99]

These are the specifications that the LLRV's maker, Bell Aerosystems Co. of Niagara Falls, N.Y., has sought to meet. The LEM has often been called The Bug; the LLRV, which simulates its performance, could be called The Flying Bedstead.

Standing 10 feet tall, it has four truss-like legs spreading a little over 13 feet apart. With a full fuel load, it weighs in at about 3,000 pounds.

The open cockpit, a platform about six feet above the ground, extends forward from the main frame between the two front legs. It accommodates a single pilot. His equipment consists of an instrument panel, a side console, three control sticks (two for power, one for pitch-and-roll control), a pair of rudder pedals, an ejection seat, and an oxygen-breathing system to protect him from the thrusters' fumes.

The LLRV gets its lift principally from a vertically mounted General Electric CF 200-2V turbojet engine. This is actually a J85 jet engine with an aft fan attached, increasing its zero-speed thrust from 2,800 to 4,200 pounds. Mounted in a gimbal ring, the engine is gyroscopically kept pointed straight down, even when the craft tilts. To simulate a lunar landing, its thrust is throttled down to exactly five-sixths of the vehicle's weight.

The remaining one-sixth of the vehicle's weight is supported by two throttlable hydrogen-peroxide lift rockets of 500 pounds' maximum thrust each. They are mounted on the LLRV's main frame and tilt with the vehicle. Thus they simulate the thrust of the LEM's single throttlable descent engine. The turbojet engine simply cancels the excess of earth gravity over moon gravity.

Eight little rocket motors, likewise powered with hydrogen peroxide, control the attitude of the LLRV. Each attitude rocket is actuated by an individual solenoid valve of on-and-off type. As in a small plane, the pilot controls pitch by fore-and-aft movement and roll by right-and-left movement of a stick. Foot pedals provide yaw control. Stick and pedals are linked electrically to the solenoid valves.

In this fashion the LLRV duplicates the entire behavior of the LEM—acceleration and attitude changes, and control response—under the true condition of one-sixth of earth gravity prevailing on the moon.

Flying the LLRV. For a lunar-landing sim-

Copyrighted material

ulation, the LLRV climbs to desired altitude on the power of its turbojet engine alone, with gimbals locked in position. Then, with its nose pushed downward 10 degrees, it is accelerated forward by the horizontal component of the jet engine's lifting force. When the craft attains the desired conditions to begin a lunar-landing simulation—for instance, 1,000-foot altitude and 40-m.p.h. horizontal speed—the jet-engine gimbal is unlocked to let its gyro-stabilizer hold it "true vertical," and its thrust is throttled back to five-sixths of the craft's weight.

Since this weight changes as a result of fuel consumption, a simple computer tells the engine exactly what thrust is needed to equal five-sixths of the weight at any moment. Possible wind effects can be offset by a rather sophisticated steering mode. Accelerometers pick up and identify any lateral or longitudinal acceleration that cannot be accounted for by the lift or attitude-control rockets—and that, therefore, must be caused by wind. In response, the gimbal actuators point the jet engine just enough away from straight down to compensate.

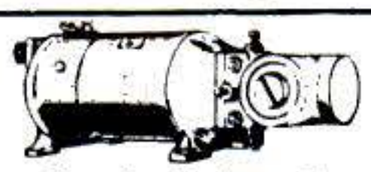
For safety, the LLRV has in reserve a standby set of six 500-pound-thrust lift-rocket engines, and a duplicate set of attitude-control rockets. It can fly with either set of each. A 22-foot drogue parachute will help in case of a jet-engine-out landing from a high altitude. As a last resort the pilot can eject—with a catapult-parachute system tested successfully even at ground level—or, given enough altitude, simply bail out.

An LLRV was first flown on Oct. 30, 1964, by Joseph A. Walker, chief research pilot of NASA's center at Edwards. Over the following year, more than two dozen flights, averaging four to five minutes and reaching up to 800-foot altitude, served to check out the vehicle's performance.

With this preliminary phase completed, the LLRVs have now gone into service for practicing moon landings. At this writing, more than 30 simulated lunar descents have been made, in a series of some 150 or more to be performed at the Edwards base—a program that may extend into late summer or fall of this year. After that, the LLRVs may be transferred to the Manned Spacecraft Center at Houston for use by the astronauts in training flights there. PS

GOVT. SURPLUS AND OTHER BARGAINS SAVE UP TO 90%

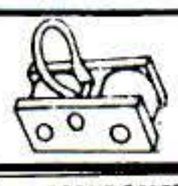
200 AMP ARC WELDING KIT Build your own arc welder-battery charger. You get all this — 200 Amp. Gen., Voltage Reg. Ammeter, Shunt, Welder's Helmet, Electrode Holder, Welder's Gloves, Reacter Coil, Toggle Switch, Rheostat, 30' Cable. All 11 items guaranteed pre-tested. Wt. 72 lbs. Approx. GOVT. COST $600. Complete with welding & battery charging diagram **$39.95**



MOTORIZED TRANSFER PUMP High volume. Delivers up to 700 gal. per hr. @ 35 PSI. Vane-type with carbon blades. Excellent for pumping water & oil base insecticides, transferring diesel fuels, gasoline, kerosene, solvents, etc. 24 V. D.C. motor. 1/4 H.P. 2500 RPM. 1½" x 5" H x 4½" W. Approx. GOV'T COST $100. Tested prior to shipment, like new. **$21.50**

AC-DC GENERATOR rated 200 AMP DC @ 24 to 30V. Also produces 1200 watts of AC current. Excellent for making your own arc welder. Also for lights and many cooking accessories. Size 14" L. x 6" dia. Tested prior to shipment. Shpg. wt. 55 lbs. Approx. GOV'T COST $350. Special **$14.95**

DC JET GENERATOR ARC WELDING KIT complete with GE Type CM Gen (30 V. D.C., 400 AMP, 3000 RPM: ampere rating is for continuous duty, intermittent amperage is 500 to 600 amps). Also 2 rheostats, 1 voltage reg., 1 voltmeter, 1 electrode holder, 1 welder's mask, 1 toggle switch, 10 lb. vacuum packed 1/8 in. welding rods, pair welder's gloves & spline coupling. All units guaranteed pre-tested. Wt. 110 lbs. Approx. GOV'T COST $700. All items **$64.50**



HEAVY DUTY MAGNET Fantastic power, will pull 125 lbs. on steel block. Excellent as underwater retriever. Picks up all ferrous metals. 4⅛" L x 1⅝" W x 4" H. Shpg. Wt. 3 lbs. **$7.95**

NEW! BIG 1966 CATALOG

Send 25c for amazing catalog with 1000's of bargains in hydraulics; electrical, marine, automotive items, etc. Order from ad. Prices FOB. 50% deposit for COD. Pls. include your zip code number. Satisfying mail order customers thru-out the world since 1945.

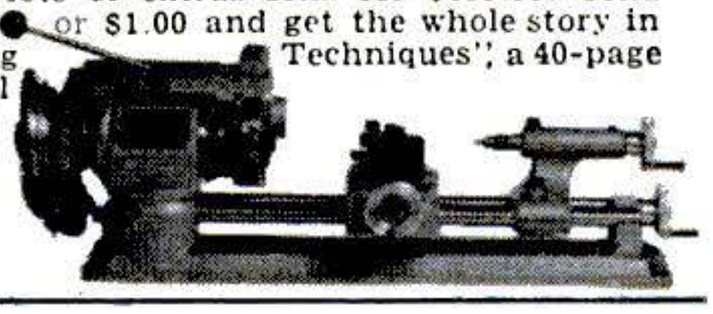
AIRBORNE SALES CO. Dept. PS266
8501 Stellar Dr. • Box 2727 • Culver City, Calif. 90231

Liquid WRENCH

LOOSENS RUSTED NUTS, BOLTS, PARTS IN SECONDS
at Service Stations, Auto and Hardware Stores
RADIATOR SPECIALTY COMPANY, CHARLOTTE, N. C.

How can UNIMAT be exciting if it bores?

Simple. It also mills, drills, grinds, polishes and more. That's UNIMAT, a miniature machine shop that operates both as a precision lathe and multi-functional tool on metal, plastic and wood. Converts in just seconds. Only 17" long, UNIMAT has satisfied thousands of exacting hobbyists with its versatility and toolroom accuracy (up to .0005"). Performs like costly big equipment while taking up a minimum of space. No prior experience is necessary to use this valuable tool. The basic unit plus lots of extras sells for $139.50. Send for free literature, or $1.00 and get the whole story in "Miniature Machining Techniques", a 40-page photo-packed manual. Write: **American-Edelstaal, Inc., Dept.** HB-6, 350 Broadway, New York, N.Y. 10013.



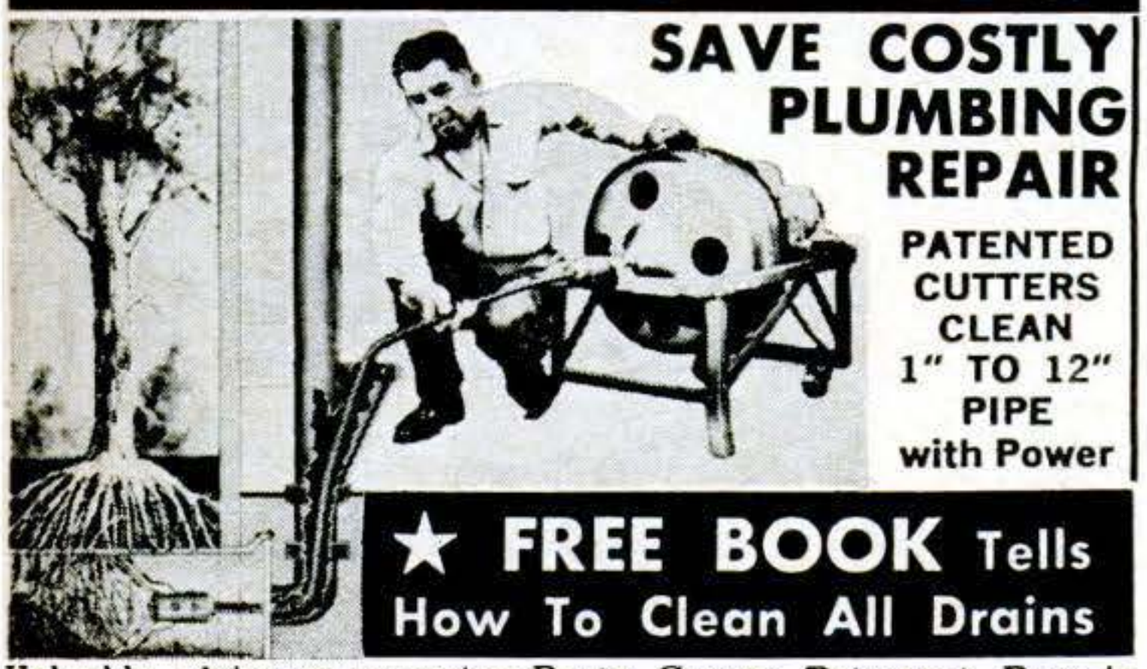
Copyrighted material

PEEL OFF PAINT with KLEAN-STRIP

- Fast, clean, safe
- No afterwash needed
- Non-flammable
- Refinish immediately

THE KLEAN-STRIP CO., INC.
MEMPHIS 6, TENNESSEE • WINNIPEG, CANADA

CLOGGED SEWERS



Valuable advice on removing Roots, Grease, Detergent, Rags in **TOILETS, SINKS, URINALS, BATHTUBS, SHOWERS, HOUSE-TO-STREET SEWERS.** Get rid of foul odors. Do your own rodding or start your own Business. Receive **FREE SKETCH** of Plumbing Pipeline in average Building. Save Plumbing Bills. Tear this ad out now and write your name and address beside it for helpful **FREE BOOK** on Power and Hand Units. No Agent will Call. (Chicago Phone Kildare 5-1702) **MILLER SEWER ROD, DEPT. PSR, 4642 N. CENTRAL AVE., CHICAGO, ILL. 60630.**

SAVE UP TO 85%

GOV'T SURPLUS and NEW EQUIP'T

Send 25¢ For 3 Big Catalogs

PUMPS
WELDERS
WINCHES
SURVEYING
TELEPHONES
HYDRAULICS
GENERATORS

ELECTRONIC
BINOCULARS
GEAR MOTORS
COMPRESSORS
SPEED REDUCERS
WEED SPRAYING
MANY OTHERS

SURPLUS CENTER Dept. PS-026 Lincoln, Nebraska

SAVES TIME • HAND WORK • MONEY

BEMACO

'400' RAPID SAW SET

Sets 400 teeth per minute on hand or band saws—perfectly, accurately! (4½ to 16 point teeth) Automatic! Fast! True hammer-anvil action! Eliminates tooth breakage. Takes seconds to adjust for any size saw. Used profitably by saw shops and manufacturers everywhere. Backed with unconditional guarantee.

Write for detailed brochure today!

BEAVER MFG. CO.
Dept. SS-2 P.O. Box 3576
3390 West 11th Ave.
Eugene, Oregon

Improving Your Home Wiring

[Continued from page 178]

and the number of bulbs, but in a typical case, runs like this:

Two 5′ lengths, Plugmold 2100	$2.93
Eight keyless raceway sockets	9.12
Two raceway end caps	.28
Two BX-raceway connectors	1.00
Double toggle switch	.58
Switch box with mounting clamps	.39
Cover plate	.25
Ten feet of 3-wire #14 BX	1.30
Package of wire nuts	.16
Four 25-watt bulbs	.92
Four 60-watt bulbs	1.40
Total	$18.33

If you are merely changing a single-level lighting unit to a multilevel, the cost will be less, of course, as much of the hardware is already there. If your built-in lighting is fluorescent, you can adapt the same system to it by adding additional fluorescents of lower wattage. This may cost less than adding a dimmer.

For floor and table lamps, the dimmers may not be connected to outlet receptacles, so floor lamps usually need their own built-in dimming system. If you want to convert one, the easiest way is with a screw-in, three-way bulb adapter. These cost less than $1, and simply screw into the existing lamp-bulb socket to take a standard three-way bulb. To change light levels turn the click-stop collar of the adapter.

Antiburglar lighting uses a dimmer switch, of course. It gives good assurance that the light you leave burning when you're away won't burn out before you get back. But there's an easier way of getting the same assurance for less than 50 cents, without tools, wiring, or work—just in case you have to act quickly. Buy a 230-volt bulb from any electrical supplier, and screw it into one of your 115-volt lamp sockets.

Operating on half its rated voltage, it gets the full 40- to 150-time life extension. The Westinghouse model 150PS25 is a good type. Specify 230 volts (it's also made in 240 which might be too dim) and the wattage you want. For a lamp in the window you can use 60 watts, which will actually consume about 20. If you want to light an entire room so that light shows from several windows, use 150 watts.

This will run at about 50 watts with a warm, mellow light, and cost you around $1 a month. But replacement cost will be low—perhaps 48 cents every 10 years. PS

Copyrighted material

The Ford, Chevy, Plymouth Wagons

[Continued from page 78]

through narrow gaps. You can judge its width pretty accurately from behind the wheel, and the steering precision is by far the best in this group. Whenever I ran up behind a double-parked car and traffic was coming the other way, I found I could usually drive straight through the remaining gap with the Chevy, while in the Ford and Plymouth I usually wanted to stop first and then sneak through at walking pace.

Cargo area. Ford has the roomiest wagon in the group with 98.9 cubic feet of cargo space (with rear seat folded) against 96.9 cubic feet in the Plymouth and 94.1 cubic feet in the Chevy. The widest tailgate is found on the car with the smallest interior width—the Fury. Curiously, the Ford leads on interior height, with a 32.4-inch maximum (measured above the rear axle) against 31.8 inches in the Plymouth and 30.7 inches in the Chevrolet.

When there are passengers in the rear seat, the Plymouth has 55 inches clear length left for luggage inside the car. The Ford comes close (54.6 inches) but the shorter Chevy only has 53 inches.

Picking a power team. With anything less than Chevy's 283-cu.-in. V-8, your wagon will be underpowered as soon as you load up with cargo or passengers. And if you don't carry large loads, chances are you don't really need a full-size wagon. My advice: If you're in doubt about engine size, always go up. The first cost is low and the extra fuel consumption is often surprisingly small. What you get with a big V-8 is a real powerhouse that can maintain any legal speed all day with power to spare for passing, climbing hills, or steering your way out of a sudden highway-emergency situation. The larger engine runs more quietly, does not overheat so easily, and does not wear as quickly as a smaller one.

Both Ford and Chevrolet have engines that can match the performance of the Fury's 383-cu.-in. engine. Ford has a 390, Chevrolet a 396. For even more power, Ford has a 428 and Chevrolet a 427; Plymouth even offers a giant 440-cu.-in. V-8.

One final word: If you're hauling a trailer with your wagon, getting an engine with enough power is just the first step. You'll also need heavy-duty brakes and suspension, a special rear axle with a "trailer" ratio, and extra cooling. PS

WON'T STAIN

NEW DAP®
LATEX CAULK

For the first time! A true latex caulk made specially for use with exterior and interior latex paints. Won't stain, bleed, blush or shine through any paint. Sold at leading hardware, building supply, paint and specialty stores.

DAP® DAP INC., Dayton, Ohio 45431
SUBSIDIARY OF Plough, Inc.

Two or four-wheel drive JEEP or SCOUT owners

REPOWER with a 6 or V-8. H.D. ADAPTORS for using Car, Compact and some Truck engines. Conversion Kits $45.35 to $56.90. Want fast action? Give us FULL INFORMATION. Send $15.00 Dep. and we will ship correct kit, bal. COD. Send full amount for prepaid shipment. Wire, phone or write today. Details FREE

HOOSIER MACHINE PRODUCTS CO.
314 S.E. 6th St., Phone 276-3442, Pendleton, Oregon

NEW DYNAMIC MARK 88
INDUSTRIAL TRANSFORMER ARC WELDER

IDEAL GIFT—EDUCATIONAL, PROFITABLE, ENJOYABLE

ANYONE CAN WELD, BRAZE, CUT, SOLDER, HEAT ON STEEL, BRASS, ALUMINUM, AND OTHER METALS.

Build and repair anything of metal. Tremendous time and money saver. THIS IS ALL BRAND NEW, PROFESSIONAL ARC WELDER! Rugged metal cabinet, baked Hammerloid finish, ideal for home, shop, farm and industrial use. Expert work on your FIRST job. POWERFUL glass insulated transformer welds ½" metals with ⅛" rods. 4 heat settings, 20 to 80 amps. Operates on 110 Volt AC house line fused for 30 amps. Complete, ready-to-use—full head shield, electrode holder, ground clamp, cables, solder, assorted rods and simplified welding manual. Double-protection guarantee: 10-day money-back trial plus full 5-year warranty on materials and workmanship. Order today: ONLY $47.50 (220V at $49.50).

• SEND ONLY $6.00

Only $47.50 Complete. Send only $6.00. Pay balance plus C.O.D. charges on delivery.
EASY PAY PLAN. Write for easy pay plan. LOW down payment, pay as you weld and earn.
Welder Details FREE

DYNAMIC WELDER CO. Dept. D3-B 1808 S. FEDERAL ST. CHICAGO, ILL. 60616

Copyrighted material

[Continued from page 101]

on a single piece of film. While the film was being processed, he rigged up a light source to fit the camera back.

"Astounding" was the comment of those who watched the first tests—the pictures were crude, but distinguishable, and there were 50 of them on one small piece of film. The next step was to build a laboratory prototype of his device and start filling out patent applications.

How it works. While complete mechanical details will have to wait until Aeroflex is ready to release them, here are some of the basic essentials.

Multiplex Recording Photography (MRP) uses only the light entering on the axis of the lens, which remains wide open regardless of light conditions (between *f*/1 and *f*/2). A modified mechanical shutter "codes" each picture as it is taken, and sets the mechanism for taking the next picture. An additional optical device is used between lens and film. Interestingly, every picture taken covers the entire area of the negative. Depth of field is greatly increased over a conventional camera, Houghton claims, and the system also boosts "optical efficiency." Example: An emulsion rated at ASA 64 is shot at 1/2,000 of a second in normal outdoor light.

A camera designed for MRP would cost no more, and possibly a bit less, than a conventional camera and would be physically smaller—film-storage space and winding mechanisms would be eliminated. A diaphragm is not needed, since only shutter speed is adjusted to compensate for light conditions. For amateur use, the camera would double as a projector, with a light source attached to the back. Prints could be made in the usual manner, using the camera or a special enlarger.

Why the emulsion-coated glass plate instead of a piece of film? Because extreme mechanical stability is required to put 250 photos on one frame. Ordinary film tends to shrink, warp, and generally change in dimensions in response to temperature and humidity changes.

Color on black-and-white film with standard black-and-white processing? Simple. A color-filter arrangement makes "separation negatives." The camera would expose for red, green, and blue (for example) and record the results on the same plate. A full-color photograph could then be produced by projecting back through the filters.

Actually, it would be possible to take almost any number of photographs on one plate, Houghton claims, but as the number increases, resolution begins to suffer. A total of 250 pictures could be taken, "with resolution comparable to that of an ordinary photograph" on a single 35mm negative. For other applications, where resolution is not critical, a single frame might hold 500 or more photos. Typical resolutions would be 10 lines per mm at 500 pictures, or 150 lines per mm at 25.

As an example of what can be done with the new photo technique, Houghton told me about a tiny "cigarette-pack" camera that he modified for a government agency. The camera used a 28mm Swiss lens and had a tiny ⅜-inch-square picture format. When adapted for MRP, it yielded 103 top-quality photos on every negative. For other work, Aeroflex is already busy modifying aerial-reconnaissance cameras for MRP for the Air Force. The advantages are obvious: MRP greatly increases effective film speed, makes processing almost instantaneous, reduces camera weight, and permits more pictures to be taken faster since the film doesn't move.

Other uses for MRP. The list of possible uses for Houghton's discovery is impressive enough to be completely startling. Here are a few:

- MRP movies. Both amateur and professional movie makers may one day get cameras that eat up just 1/300 of the film that present day models require. And they could shoot in color on black-and-white film!
- Microfilm libraries for the home? Why not? Books and newspapers may be on the way out if a simplified MRP microfilm reader comes on the market. An entire book could be recorded on just one frame.
- Space photos. Our next probe to Mars may well utilize MRP. The data contained on an MRP negative could be transmitted back to earth in the same time and with the same facilities that it would take to transmit a single conventional photo. But the single negative could be converted back into hundreds of individual pictures.
- Radioed photos. Transmission of photographs on earth, as well, may be revolutionized by the new technique—by satellite, wire, or radio, a single MRP photo can now convey a fantastic amount of data. PS

Copyrighted material

POPULAR SCIENCE MONTHLY
355 Lexington Ave., New York, N. Y. 10017

MAIL ORDER OPPORTUNITY MART

Products — Services — Opportunities, both classified and display for Popular Science's more than 6,000,000 top-notch prospects.

CLASSIFIED ADS $1.35 per word per insertion, payable in advance. Minimum ad, 10 words, $13.50. Advertisers using post office box number in ad must furnish complete name & street address for our records. Closing date for April issue (on sale March 29) is February 17th. No cancellations after February 15. Send copy and remittance to O.K. Kelley, Classified Adv. Mgr.

DISPLAY ADVERTISING rates on request. Write % H.B. Fleischman.

1 AUTOMOBILES & MIDGET CARS

NEW Car every year at little cost through local dealers. Explosive Guide of startling facts shows how. Free literature. CarResearch, P.O. Box 2332, St. Louis, Missouri 63114.

AUTOMOBILE Literature: Mercer reprint, literature exchange. Information: Enthusiasts, Box 451A, Mt. Clemens, Mich. 48043.

JEEPS! Broncos? 98 Pages information on Dealer Costs. Cars—Pickups—Foreign—Domestic—Gov't. Surplus. Save Hundreds. Only $2. Wheeler-Dealer, Box 187, Abbottstown, Penna.

2 AUTO SUPPLIES & EQUIPMENT

JEEP Parts Catalog! Military and Civilian. For owners, dealers, garages, service stations. Save $$$. Surplus and replacements. American Auto Parts Co., 1830 Locust, Kansas City, Missouri.

ANTIQUE Car Pistons, Gaskets, Gears, Valves, Etc. Catalogue $1.00. Antique Auto Parts, Milwaukee, Wisconsin 53204.

JUST Out! New 244-page Auto Parts, Accessories Catalog. Save up to 50% on over 100,000 items for all makes, models of cars, trucks, foreign and sports cars, Model "A", "T" from 1909 thru 1966. Latest Hollywood accessories, custom and hi-speed equipment. Rush 25c for postage, handling—refundable on first order. Whitney, 1919—PS2 Archer, Chicago, Ill. 60616.

SNO-DRIVES® (patented) used by automobile racers, fast track, or ice-snow-mud traction, stabilizing, makes champions! Professionals write for deal, faster time guaranteed! You win using Sno-Drives centrifugal force system, using same horsepower! Timid racers not wanted. Bateson Incorporated, 4408 Market, Wilmington, Delaware.

JEEP Parts Catalog! Military and Civilian. For owners, dealers, garages, service stations. Save $$$. Surplus and replacements. American Auto Parts Co., 1830 Locust, Kansas City, Missouri.

CROSLEY New, Used Parts. Box 7, Elmont, N. Y.

FOREIGN Car Parts, Discounts. Box 7, Elmont, N. Y.

PARTS Model "A." List 25c (Refundable) Matco, Box 135, San Pedro, Calif.

NEWLY invented Snomat gets your stuck car out of snow—no rolling—no throwing. Money back Guarantee. $1.50 postpaid. Box 617B, Franklin, Michigan.

ADD an Ignition Glow Gage $2.00 pp. Q-Arc, Box 47876, Los Angeles, Calif. 90047.

ACCELEROMETER, Dynamometer. Accurate Electronic Details 50c, Box 461, Yakima, Wash.

USE THIS HANDY INDEX TO FIND WHAT YOU WANT

Advertising, Agencies for Advertisers . . . 53
Agents Wanted . . . 43
Antiques, Relics & Indian Goods . . . 29
Art Instruction, Cartooning, Sign Painting . . . 54
Astronautics . . . 5A
Authors Service . . . 52
Auto Supplies & Equipment . . . 2
Auto Trailers . . . 3
Automobiles & Midget Cars . . . 1
Aviation . . . 5
Batteries, Generators, Etc. . . . 6
Boats, Inboard & Outboard Motors . . . 11
Body-Building Courses, Jiu Jitsu, Etc. . . 12
Books & Magazines . . . 23
Business Opportunities . . . 37
Business Service, Information, Name Lists . . . 50
Buy It Wholesale . . . 38A
Cameras, Photo Supplies . . . 34
Camping Equipment & Tents . . . 16
Coins & Currency . . . 26
Contests . . . 46
Detectives . . . 47
Do-It-Yourself . . . 66
Dogs, Birds, Hamsters & Pets . . . 17
Earthworms, Crickets, Frogs . . . 18
Educational & Instruction . . . 45
Electric Trains . . . 64B
Electrical Supplies & Equipment . . . 7
Employment Information . . . 42
Engines, Motors, Etc. . . . 10
Farms, Other Real Estate . . . 19
Field Glasses, Telescopes . . . 14
For Inventors . . . 60
For Sale Miscellaneous . . . 71
Formulas, Plans, Etc. . . . 39
Government Surplus . . . 11A
High-grade Salesmen . . . 44
Hobbies, Collections . . . 31
Home Craftsman . . . 65
Import-Export . . . 38B
Inventions Wanted . . . 61
Loans By Mail . . . 80B
Machinery, Tool Supplies, Etc. . . . 9
Magic Tricks, Puzzles, Etc. . . . 25
Minerals & Precious Stones . . . 30
Miscellaneous . . . 79
Models, Model Supplies . . . 64
Moneymaking Opportunities . . . 38
Motion Pictures & Color Slides . . . 33
Motorcycles, Bicycles & Supplies . . . 4
Musical Instruments and Song Writers . . 35
Of Interest To Women . . . 70
Old Gold, Jewelry, Watches . . . 67
Patents For Sale . . . 62
Personal . . . 80
Phonograph Records . . . 35A
Photo Finishing, Photocopies, Etc. . . . 32
Plastics . . . 40
Printing, Multigraphing, Etc. . . . 57
Printing Outfits, Supplies . . . 58
Profitable Occupations . . . 22
Radio, TV, Electronics, Hi-Fi . . . 36
Remailing Service . . . 80A
Rubber Stamps & Office Supplies . . . 56
Science & Chemistry . . . 41
Special Services . . . 51
Sporting Goods, Guns, Fishing Tackle, Etc. . . . 15
Stamp Collecting . . . 28
Treasure Finders & Geiger Counters . . . 77
Trees, Shrubs, Roots & Herbs . . . 20
Wanted to Buy . . . 72
Watch Repairing . . . 78
Wearing Apparel . . . 73
Welding, Soldering . . . 8

VOLKSWAGEN Powerpack design gives 20% more power and at elevation. Adapt yourself. Illustrated instructions $5.00. Koop, 25E, Larsen, Fresno, Calif.

AUTO welding repair training in world's largest non-profit welding school. Low tuition. Free booklet. Hobart Welding School, Box P-26, Troy, Ohio.

3 AUTO TRAILERS

PICKUP Camper, Trailer Or Pickup-Cover—Build Yourself, Save! Complete plans $3.95 each. Bus Conversion (and Houseboat Interiors) Drawings $2.95. Equipment Catalog $1.00 (refundable). Satisfaction guaranteed. Details 10c. Viking Camper Supply, 94-J Glenwood, Minneapolis, Minn. 55403.

BUILD Your Pickup Camper. Pre-cut Kits. Blueprints. Supplies. Literature 10c. Comstock Trailers, Dept. 665, Parsons, Kansas 67357.

PLANS—Trailers for flat bottom boats, convertible to utility $2.50. Plans for weatherproof utility trailer $2.50. Both $4.50. Spartan Specialties, P.O. Box 2821, Spartanburg, S. C. 29302.

TRAILER Camper—Fold tent type. Strong, roomy, easily built. Plans $3.50. Camper, Box 178a, Round Lake, Minnesota.

BUILD Your Own—Save! Econoline Camper Plans, Fold-out Trailer, or Bus Conversion Drawings, Including Materials catalog, $2.95 each. Guaranteed satisfaction. Catalog $1.00 (refundable). Details, dime. Campers, Box 263-J, Hopkins, Minn.

4 MOTORCYCLES, BICYCLES AND SUPPLIES

RECONDITIONED Motorcycle Motors. Large Stock. Indian, Cushman, Vespa, Mustang, Royal Enfield. Parts. Indian Motorcycle Sales, Kansas City, Missouri 64127.

KART Frame $12. Three Wheeled Motorscooter $29, Vespa $30, Sears Kart $40, Hydroplane $20, Snowmobile Engines $5 up. (Mailorder only). Send 25c (35c for First Class Mailing) for Directory-Catalogue Number 127 listing these and hundreds of other bargains, Homebuilders Parts, Plans, etc. Midget Motors Directory, Athens, Ohio.

CONVERT Bicycle to Motorbike! Plans . . . . $1.00: Go-Byk Industries, Rothsay, Minnesota 56579.

5 AVIATION

PROPELLERS, Plans, Kits, Supplies for airboats, snowplanes. Gauges, spark plugs, gas-oil hose, oil coolers, primers, wrenches, switches, propeller hubs, engine mounts. Corvair-Volkswagen Conversion parts. 125-190 Lycoming engines, manuals, gaskets, parts. Catalog 50c. Banks-Maxwell, Box 3301G, Ft. Worth, Texas 76105.

HOT Air Balloon kit 10', $4.00 postpaid, complete. U. S. Sportcraft, Box 847, Woodland Hills, California.

Copyrighted material

5A ASTRONAUTICS

ROCKETS: New Illustrated Catalogue 25c. Single and Multi-stage Kits, Cones, Engines, Launchers, Trackers. Technical Information, etc. Fast Service. Estes Industries, Penrose 32, Colorado.

6 BATTERIES, GENERATORS, ETC.

COMPLETE Rebuilding Manuals! Batteries $3.00. Hydraulic Jacks $3.00. C.O.D. Accepted. Bayer Publications, 938 Betty Avenue, Neenah, Wisconsin.

7 ELECTRICAL SUPPLIES & EQUIPMENT

ELECTROPLATING Equipment And Supplies Send $1. Refundable. For Formulas, Equipment Guide, Operating Data And Catalog. HBS Equipment Division, Dept. N7, 3543 East 16th, Los Angeles, Calif. 90023.

PLATING Instruction Book, solution formulas $1.00. Craft Publication, 7366 Brookdale Ct., Dublin, Calif.

THREE-PHASE Advantages on single-phase service with T-P Phasing Units. Prices & literature. T-P Elec. Mfg. Corp., Box 265, Odin, Ill.

RECORD Telephone conversations. Under phone, suction type (specify) $1.00. Bargains galore. Free catalog. ElectriCity, P.O. Box 4, Plainview, N.Y. 11803.

MAKE telephones portable. Standard jacks or plugs $1.00—both $1.89. Instructions included. Bargains galore. Free catalog. ElectriCity, Box 4, Plainview, N.Y. 11803.

8 WELDING, SOLDERING

WELDERS—110-220 150 Amperes $49.50. Morris, 1070 Inner, Schenectady, N. Y. 12303.

ACETYLENE Welding Outfits, New $69.50; Used $50.00; Arcwelders. Eagle Welding, Dept. 42, 5085 Broadway, Chicago, Illinois 60640.

9 MACHINERY, TOOL SUPPLIES, ETC.

STANLEY, Millers Falls, Skil, Disston, Wiss, Plumb, Channellock, Bonney, Herbrand, Ridgid, and hundreds of other Nationally Advertised Brands at Prices Hard to Beat. Send 25c for our Big Tool Catalog Today! Silvo Hardware, 107-PS Walnut, Philadelphia 6, Penn.

UNIQUE Tools: $1.00. $5.95. Stahl Mfg., 3166 Wadsworth, Saginaw, Mich.

HAND and Power Tools. Many name brands. Send $1.00 for catalog. Robert's Tools, 1874 Pinetree, Trenton, Mich. 48183.

"SMALL Shop Supplies." Production-hobby. Machinist Tools. 1424 Barclay, Springfield, Ohio 45505.

10 ENGINES, MOTORS, ETC.

GM INJECTOR Parts and Pumps Wanted—Used or New. Mayer, 2093 East 19th St., Cleveland, Ohio 44115.

REWIND Motors yourself. Complete instructions $1.00. Lewis Manufacturing, Howell 11, Michigan.

CHAIN Saws, motorscooters parts. Wholesale catalog 25c. Loren Products, Danville, Illinois.

REWIND car generator for 110 V.A.C. power plant. Plans $1.00. R. Schmauss, 1228 E. Cass St., Tampa, Florida.

11 BOATS, INBOARD & OUTBOARD MOTORS

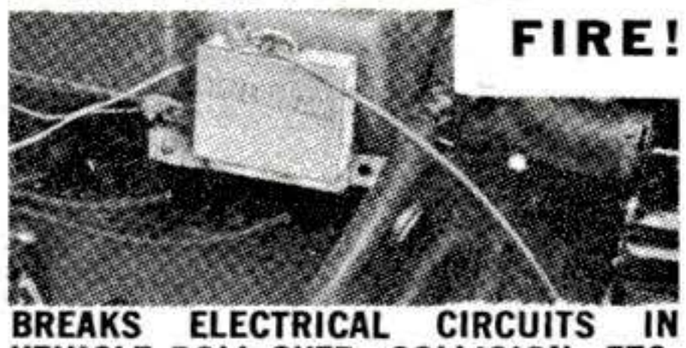
BOAT Plans, frame kits, full size patterns all prepared specially for amateurs. Send 50c for new catalog illustrating 55 proven designs including sail, inboards and outboards from 7' to 28'. Glen Marine, 9152 Rosecrans, Bellflower, Calif.

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

EASY TO INSTALL **FIRE-CHEK**

AUTOMATIC SAFETY DEVICE

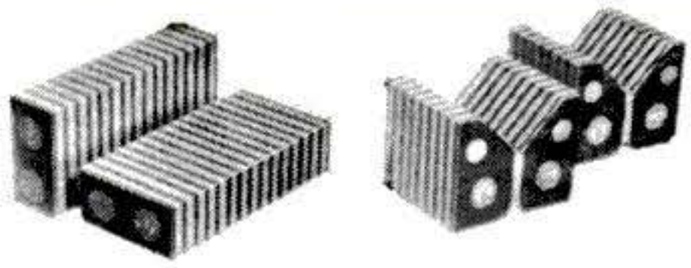
PROTECTS CARS from FIRE!



BREAKS ELECTRICAL CIRCUITS IN VEHICLE ROLL-OVER, COLLISION, ETC.

Fool-proof, compact unit instantly renders electric system "cold" to eliminate fire hazard in accidents! Ordinary road bumps, etc. will not activate. Install yourself easily, quickly. For all vehicles—6, 12, or 24 Volt system in cars, boats, buses, trucks, etc. Also operates manually—prevents children starting engine, power windows, cig. lighter, blowing horn. Guaranteed. Complete, with instructions: $5.95 plus 75c postage & handling.

FAIR SALES • P.O. Box 1105 • Lima, Ohio



Magnetic chuck V Blocks & Parallels, Edge Finders, Center Finders, Thread Measuring Wires, Slide Bars. Hi-Precision—First Quality—Low Prices. Factory Distributors wanted. Be the dealer in your locality. Buy for yourself and sell to others. Liberal discount, products guaranteed. Est. 1943. Write for brochures. **FISHER MACHINE, 11704 Inglewood, Hawthorne, Calif.**

FULL size, cut-to-shape boat patterns, blueprints. Send 50c for big New illustrated "Build a Boat" catalog includes Fishing Boats. Garvies. Cruisers, Catamarans, Houseboats—Outboards, Inboards, Sailboats—7½ to 38'. "How to build a Boat" booklet $2.50. Cleveland Boat Blueprint Co., Box 18250, Cleveland, Ohio.

WORLD'S finest boat kits, frame kits, models from 8 to 24 feet—prams—skiffs—runabouts—cruisers—all leaders in styling and performance. Send 50 cents for catalog—$1.00 for catalog plus boat building handbook. Custom Boat Designs, 1709 Niagara St., Buffalo, N.Y. 14207.

BOAT Plans—world's largest selection, frame kits and full size paper patterns—designs for the amateur—over 200 proven designs from all over the world—fishing boats—cruisers—sailing—inboard and outboard hydroplanes. Send $1.50 for catalog—$2.00 for catalog plus boat building handbook. Custom Boat Designs, 1709 Niagara St., Buffalo, N.Y. 14207.

BOAT Kits. Factory molded fiberglass or pre-assembled plywood. 50 models, 12' to 40'. Runabouts, Cruisers, Houseboats. Free catalog. Luger, Dept. AC-66, 9200 Access Road, Minneapolis, Minnesota 55431.

FIBERGLASS cloth, matt, polyester and epoxy resins. Lowest prices. Seifert's, Box 1206-X, Green Bay, Wis.

FIBERGLASS, Resin, Foam, Brass, bronze screws. Prepaid, no tax. Boat plans. Free catalogue. Stiles, 11-S Mantua Hts., New Jersey.

FIBERGLASS Canoes. Three exciting models. Easily assembled kits. $29.95 up (factory direct). Free literature. Riverside Canoes, 5819G Victoria Ave., Riverside, California.

POWER your inboard with V-8 thrust. Complete marine conversion kits for Chevrolet, Ford, etc. Catalog 50c. Star Marine, Berkeley 10, California.

SAILBOATS: 8' Pram $129.00, 11' Dinghy $295.00, 12' Sloop $395.00. Kits available. Write: Cyclone Sailboats, 2314 Ginny Ave., Columbus, Georgia.

11A GOVERNMENT SURPLUS

CHEEP Jeeps. Buy from Gov't. Full information 25c. Box 789PSTF, York, Pa.

WAR Surplus Catalogue, Generators, Pumps, Gearboxes, Hydraulics, Winches, Motors. 25c stamps or coin. Trader, Box 8 PSTF, Thomasville, Penna.

GOVERNMENT Surplus Jeeps: How to buy in your area and 400 item Surplus Catalog $1.00. Quality Surplus, Box 22038 P1, Indianapolis, Indiana.

GOVERNMENT Surplus. How and Where To Buy In Your Area. Send $1.00. PS Surplus Information, Headquarters Building, Washington 6, D.C.

JEEPS From—$52.50, Typewriters From $4.15, Cars From—$31.50, Walkie-Talkies, Guns, Airplanes, Boats. Typical "As Is" Bid Bargains from Uncle Sam. Tremendous Variety. Exciting Free List. Enterprises, Box 402-S1, Jamaica, New York 11430.

CHEEP Jeeps $53?? Buy one or hundreds from U.S. Surplus. Official information plus Free Surplus Catalogue, 50c. Surplus, Box 187PS2, Abbottstown, Penna.

JEEPS Typically From $53.90—Trucks From $78.40—Boats, Typewriters, Airplanes, Sporting Equipment, used. 100,000 Bargains Direct From Government. Many In Your Area. Complete Sales Directory and Surplus Catalog $1.00 (Deductible First $10.00 Order). Surplus Service, Box 820-B, Holland, Michigan 49424.

JEEPS being sold at Bargain Prices by Government. For latest information regarding only 2 Sale Centers still open, send 25c to: Government Surplus Jeeps, Box 177PS2, Abbottstown, Penna.

12 BODY-BUILDING COURSES JIU JITSU & ATHLETIC EQUIPMENT

"GIANT Arms." Dr. Young's D. C. Revolutionary discovery, $2. Satisfaction or refund. Gaucho, Box 9309-S6, Chicago 90.

APPEAR Taller! Free growth facts! Statures—PS3, Box 10, Brooklyn 7, N.Y.

POWERFUL Muscles Fast! Free brochure! Universal, Box 4327-B Northeastern, Dearborn, Michigan.

KARATE—Free details. Bales Co., 5050, Route 2, P.S., Escondido, Calif.

EFFORTLESSLY acquire overpowering brute weight! 21-day multivitamins, $2.00! Big Ben, 26 Court, Brooklyn 11201.

BAR-BELL Course, illustrated $1.00. Catalogue 10c. Good Barbell, B-1495, Hendersonville, N. Car.

BUILD terrific body! Why be bullied? Send self-addressed stamped envelope. Crest, Box -92, Mount Royal, New Jersey 08061.

GAIN 50 lbs. in 6 Months. $2.00. M.H., 2865 Oahua, Honolulu, Hawaii.

14 FIELD GLASSES, TELESCOPES

FREE Catalogue! Thousands war surplus optical bargains. Lenses. Prisms. Telescopes, Binoculars, etc. Jaegers, 691G Merrick Road, Lynbrook, New York.

SCIENCE Bargains! Lenses, Telescopes, binoculars, microscopes, kits, parts, war surplus. Send $1.00 for beginner's 10-lens kit with instruction booklet. Order Stock 2-CN. Request Free 148-page Catalog CN, Edmund Scientific Co., Barrington, New Jersey.

BINOCULAR Sale! Free color catalog 100 models $9.95-$250.00. Write, United, 9043 So. Western BCAT-8616, Chicago 60620.

BUILD Your Own Reflector Telescopes: Complete Kits; Mirrors, Eyepieces, Tripods, Free Catalog F describing other accessories sent on request. Also Free Brochure describing amazing line, World Famous "Dynascope." Reflector Telescopes. Criterion Manufacuring, Dept. KP 35, Hartford, Connecticut.

BINOCULARS Direct from Manufacturer. Finest Quality, Tremendous Savings! Request Catalog. Koyu, 3860 Crenshaw Blvd., Los Angeles, California.

ASTRONOMICAL books, Star—Atlases, free list. Herbert Luft, Box 91, Flushing 64, N. Y.

QUALITY Astronomical Telescopes, Components, Free catalog and technical assistance. Mitrex Instruments, P.O. Box 1911, Pittsburgh, Pa. 15230.

Copyrighted material

15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

FREE . . . Wholesale Catalog. Beads. Spinners. Lure Parts. Sinker Molds. Jigs. Reels. Finnysports (PE) Toledo, Ohio 43614.

FREE! Newest edition famous Corcoran catalog. Largest selection hunting, camping, fishing equipment. All items field tested. Boots, clothing, fishing tackle, tents, gun cases, sleeping bags. Dozens of specialities. Corcoran. Dept. PS-26-C. Stoughton, Massachusetts.

OVER 5,000 Hard-To-Find Fishing Specialties and kits galore. Send for free 170-page catalog. Netcraft Co., Dept. PS. Toledo, Ohio 43613.

UNDERWATER Fuse 3/32" diameter 60 feet with formulas, instructions, $1.00 postpaid. 125 feet $2.00. Wayno, Box 182-B, Addison, Mich.

ALTER Jap rifles to 30-06 or 257—$6.00. General Gunsmithing Catalog 15c. T P Shop, West Branch 10, Mich.

OUTDOOR Discount Catalog Featuring Rods, Reels, Lines, Golf Equipment, etc. Orchard Trading Company, Box 241-P, Hastings, Michigan.

FREE catalog exciting fun "Go Fly A Space-Bird" cloth kite. Kite Creations, 780P State, New Haven, Conn. 06502.

JUDO, Karate supplies, accessories, 28-page catalog 25c. Nozawa Trading, 232 East Second Street, Los Angeles, California 90012.

16 CAMPING EQUIPMENT & TENTS

CAMPING Equipment, Tents, Sleeping Bags, Air Mattresses, Packs, Trailer Awnings, Dining Canopies, Axes, Knives, Lanterns, Stoves, Refrigerators, Compact Camp Furniture, Dehydrated Food, Toilets, Nested Cook Sets, Poles, Stakes. Every Camping Accessory imaginable. Free 100 page catalog. Morsan, 810G, Route 17, Paramus, New Jersey.

CAMPER Jacks, guaranteed fit any camper, $57.45. Free literature. Mail Order Manufacturing, Box 851C, Spokane, Washington 99210.

17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

RAISE Rabbits on $500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

LIVE Seahorses, marine specimens-aquarium supplies. Illustrated catalog 15c. Marine, Box 248-107, Dania, Florida.

EARN $10,000 Yearly Raising Angora Rabbit Wool for us. Particulars 25c coin. Angora, Malta 1, Montana.

BIRDHOUSE Kit prepaid only, $3.75. Cobalt Enterprises, P. O. Box 6572, Sparrows Point 19, Maryland.

MONKEYS $10.00 up. Mammals, birds, reptiles. Confidential wholesale list $1.00. Dale Logston, Box 682, Saint Joseph, Missouri 64502.

18 EARTHWORMS, CRICKETS, FROGS

EARN Money raising fishworms for us! Exciting details free! Oakhaven-121, Cedar Hill, Texas.

RED Wigglers: Select breeders or fishing size $3.50—1,000, $14.25—5,000; bedrun $9.95—10,000. Postpaid. Free folder "Growing Fishbait." Fain's Bait Farm, Box 56A, Edison, Georgia.

MEN! WOMEN! Make money raising Bait. We buy your crop! Wigglers, Warsaw 3, Indiana 46580.

FREE Literature—We teach you how to raise, sell fishworms, crickets. Hybrid redworms 3000—$5.95, 5000—$8.95, 10,000—$16.95. Postpaid. Carter Farm-12, Plains, Georgia.

19 FARMS, OTHER REAL ESTATE

ABANDONED Timber Leaselands! Choice 640 acre Sportsmen's paradises still available—$20.00 plus $6.50 Taxes yearly. Maps, pictures, $1.00 (Refundable). Director, Erindale 3, Ontario, Canada.

MONEY IN WORMS

SUCCESS for You! Raise Fishworms and Crickets. Write for FREE literature and our Success Story in LIFE Magazine. Let us teach you our Secrets of Success.
Carter Worm Farm-15, Plains, Georgia

CANADIAN Vacation Lands: Full price $385.00. 40 acres, $10 month. Suitable cottage sites, hunting, fishing, investment. Free information. Land Corporation, 3768-D Bathurst, Downsview, Ontario, Canada.

FLORIDA Campsites—deep in the heart of the great Ocala National Forest. Good hunting and fishing. Free maps and Photos. Winfree Vernor, DeLand, Florida. AD646369D.

$1 Acre — Canadian Border — Hundreds campsites, islands, farmlands, directly from Tax Authorities. (Non-profit). Lists, photographs mailed. Register, Room 204, 92 King St. E., Toronto 1, Canada.

FLORIDA Water Wonderland—Home, Cottage, Mobilsites. Established area. $590 full price, $9.00 a month. Swimming, fishing, boating. Write: Lake Weir, Box HA 38, Silver Springs, Florida. AD 6-1070 (F-1).

GOVERNMENT Lands . . . Low as $1.00 Acre. Millions Acres! For Exclusive Copyrighted Report . . . plus "Land Opportunity Digest" listing lands available throughout U.S., send $1.00. Satisfaction guaranteed! Land Disposal, 2230-EA Wisconsin Avenue, Washington, D.C. 20007.

ARIZONA—Large level lots, water, power, oiled streets. $495 complete, $10 down, $10 month, no interest. Free pictures, maps. Write Box 486, Kingman, Ariz.

FREE!—All New Spring Catalog. Giant 180 pages! Thousands of properties described, pictured—Land, Farms, Homes, Businesses—Waterfront, Recreation, Retirement. Selected Best Buys from the World's Largest. 490 Offices, 35 states Coast to Coast. Mailed Free! Strout Realty, 60-ZB E. 42nd St., N.Y., N.Y. 10017, 7 ZB S. Dearborn St., Chi., Ill., 60603, 521-ZB E. Green St., Pasadena, Calif. 91101.

THE Only "No-Risk Land Purchase Plan" in America—10 year money back guarantee on any Vacation, Retirement or Investment homesite in Boiling Spring Lakes—the multi-million, 14,000-acre development on the Carolina Coast. All facilities, electricity, roads, shopping center, motel, golf course, country club, already in. Private ocean beach. ¼-acre homesites as low as $435.00; $5.00 down. Write for free literature. Boiling Spring Lakes, Southport 2-P, North Carolina 28461.

FREE! 152 page Spring catalog! Over 1800 Pictures! Farms, Ranches, Homes, Businesses, Vacation and Retirement Properties in 29 states coast to coast! United Farm Agency, 612-PS West 47th St., Kansas City, Mo. 64112.

GOVERNMENT Owned Land in 25 States available as low as $1.00 Acre. Comprehensive report $1.00. Suttco, 2258-C Hepburn, Dayton, Ohio 45406.

20 TREES, SHRUBS, ROOTS, HERBS

EVERGREEN seedlings and transplants in leading varieties for Christmas and forest tree production. Free price list and planting guide. Flickingers' Nursery, Sagamore, Pa. 16250.

22 PROFITABLE OCCUPATIONS

INVESTIGATE Accidents. Earn $750 to $1,400 monthly. Car furnished. Expenses paid. No Selling. No college education necessary. Pick own job location. Investigate full time. Or earn $8.44 hour spare time. Men urgently needed now! Write for Free Book. Absolutely no obligation. Universal, CPS-2, 6801 Hillcrest, Dallas, Texas 75205.

AUCTIONEERING—Resident and Home Study Courses. Diploma granted. Auction School, Ft. Smith, Ark.

BECOME independent with your own franchise business. Thousands earning handsome incomes. Request interesting facts today. National Franchise Reports, F-528, 333 North Michigan, Chicago 1.

VENDING Machines—No Selling. Operate A Route of Coin Machines and Earn Amazing Profits 32-page Catalog Free. Parkway Machine Corporation, 715PSP Ensor Street, Baltimore 2, Maryland.

SCIENTIFIC Massage: Big earnings, uncrowded profession. Learn spare time at home. Diplomas awarded. Free catalog. Write: Anderson School, Dept. B-2C, Princeton, Illinois.

MONEY: Become finance broker part or full time. Ra-Mar, P.O. Box 482, Desk 2, Oklahoma City, Oklahoma.

WITHOUT experience, earn up $100 a week, spare or full time, showing 250 fast-selling household necessities. Write Gibson, Dept. 471, P.O. Box 1142, Indianapolis, Ind.

START in Showbusiness. Information $1.00. Meades, Box 3364, Anaheim, California.

AMAZING profits in creative writing. Details free. Abe Gross, 458 E. 43rd Ave., Vancouver 15, British Columbia, Canada.

INVESTIGATE Fires, Storm Damage, Accidents for Insurance Companies—pays up to $1,000 a month, part or full time. No college necessary. Car furnished; expenses paid. We train you at home in spare time. Keep present job until ready to switch. Pick your location. Men badly needed now. Full information Free. Write Liberty School, Dept. C-151, 1139 W. Park, Libertyville, Illinois.

TYPIST, Start your own Mailing List Business. Instructions—25c, Stamp. Cratie Van-Hooser, 220 Main, Athens, Louisiana 71003.

"SEVEN Steps To Importing." Start the day you receive. $3.00. W. E. Malley, 5025 12th N.E., Seattle, Wash.

FREE Report: "609 Unusual, Successful Businesses." Box 51-D, Des Plaines, Ill.

MAKE Money Writing Short Paragraphs. Information Free, Barrett, Dept. C-86-A2, 6216 N. Clark, Chicago 26.

FREE Book "990 Successful, Little-Known Businesses." Work home! Plymouth-95T, Brooklyn, New York 11218.

FREE Literature—Make Big Money Raising Fishworms and Crickets. Carter Farm-10, Plains, Ga.

23 BOOKS & MAGAZINES

FREE Catalog unusual books. Murry Company, Dept. 265, 3000 Truman, Kansas City, Mo. 64127.

BOOKHUNTERS: All Subjects. Send Wants! Sydney Jaher, 175-45 88 Ave., Jamaica, N. Y. 11432.

ALASKA! Learn about the frontier state! Five back issues. Interesting, illustrated Alaska Sportsman magazine $1.00 postpaid. Twelve for $2.00. Alaska Specialties, Ketchikan, Alaska.

NEW Books. 35c up. Free Catalogue. Postal, 2217 Lackland, St. Louis, Missouri 63114.

HOW-TO-DO-IT Book, paperbacks, One Dollar books and Records. Details sent free. Bookrecs, Box 192, Jamaica, New York 11415.

PAPERBACKS, Lafayette Hill, Pa. 19444. Catalog 5c. Paperback books, records, tapes, stationery.

BOOKS-Unusual. 2000 Subjects. Catalogs 15c. Myers Books, Marquand, Missouri 63655.

HOW to make 6% or more on investments. Details Free. Van's Mail Mart, 2372 Belmont Ave., Long Beach, Calif. 90815.

ATHIEST, intellectual, scientific, research books. Free Catalog. Truth Seeker, Box 2832, San Diego, Calif. 92112.

101 EASY Ways To Find Buried Treasure, Box 57, Seminole, Oklahoma 74868.

OLD & new books supplied! Monson, 4524 Montview, Denver 7, Colorado.

CHALLENGING! Different! Unusual books! Free catalog. Ruby's, D-31, Paradise, Pennsylvania 17562.

Copyrighted material

25 MAGIC TRICKS, PUZZLES, ETC.

WORLD'S finest professional magic Joker novelties. Giant illustrated catalog 10c. Top Hat, Evanston 13, Illinois.

COMPLETELY illustrated 84 Page Catalogs, 25c. Manhattan Magic, Box 334-S, N.Y.C. 11.

WORLD'S Greatest Professional Magic, Tricks, Jokers! Giant illustrated catalog! Deluxe!! 164 pages thi.k! 10c. House of 1000 Mysteries, Dept. PS5, Northeast Fifth Ave., Ft. Lauderdale, Florida 33308.

500 TRICKS. Douglas famous Catalog No. 36, only 10c. Contains best in magic for pocket, parlor, club, stage. Fastest service to magicians for over 50 years. Douglas Magicland, Dept. 22, Dallas, Texas 75221.

MAGIC Catalog. World's finest. 3000 tricks (340) pages $2.50. Beginners, amateurs, professionals. Kanter's, P-200 South 13th St., Philadelphia, Pa. 19107.

BE A Magician! Two booklets explaining sixty-eight tricks plus large professional catalog. $1.00. Magic Inc., 5080 Lincoln, Chicago, Illinois 60625.

GIANT Magic Catalog and free trick only 10c. Write today. Mailmart, S266 Box 616, White Plains, N. Y. 10602.

40 PAGE illustrated United States and Canadian coin list 10c. Stone, 260 Washington, Boston 8, Mass.

FREE magic catalog. Houdini sensational escapes, handcuffs. Stage illusions. Magic, Jokes. Write today. Heaney Famous Magician, Oshkosh, Wisconsin 54902.

26 COINS & CURRENCY

CIVIL War Specials: 1863 Cent, $1.75; 1863 Civil War Token, $1.75; 1864 Genuine Confederate States of America $10.00 Bill, $2.00. All three $5.00. Rarcoa, 31-A North Clark, Chicago 60602.

1966 CATALOG Now Ready. 50¢ with Refunding Certificate. Hobby Sales, St. Paul, Minnesota 55116.

25 DIFFERENT coins from 25 foreign countries. $1.00 bargain, Hindley, Box 708, Aurora, Illinois.

GIGANTIC Coin Clearance. Illustrated lists 10c (refundable). Hutchinson's, Box 6256, Philadelphia, Pa. 19136.

100 FOREIGN Coins $2.95. 2 Mexican silver dollars $1.00. 100 foreign bills $3.95. Garvin, 3530 West Pierce, Phoenix, Arizona 85009.

COIN Magazine, 200 pages. Sample 50c. Numismatic, 7320 Milwaukee, Chicago 31.

UNCIRCULATED $½: Oregon Trail, Daniel Boone, Arkansas Centennial, each $13.50. 1961, 1962 Proof Sets, each $6.75. World's Greatest Bargain Catalogue $1.00. Bebee's Incorp., 4514 North 30th, Omaha, Nebraska 68111.

TRUNKFUL 25,000 Indian-Lincoln cents mixed (from the 1920's & older). Will pack "Grab-Bag" style. 400 mixed—$25.00. Sample bag of 20—$2.00. Mrs. Fischer, Box 54907, Sherman Oaks 66, Calif.

DOLLAR Specials—1955S Mint Set, circulated. 2 sets 1943PDS (brilliantly reprocessed). 50 Mylar coin holders. Nickel date restorer. List free. CCCC, Conover, N. C. 28613.

50 LINCOLNS—All Different, plus your choice P or D uncirculated Kennedy half dollar, only $2.00 postpaid. Mickey Sales, Box 82, Brooklyn 11229.

FREE Coin Supplies, Giant Coin list 10c (refundable). Economy Sales, Mansfield, Massachusetts.

50c California gold pieces. 1849-1858 75c each. Seven different $4.00. 25—$13.00 Withholders. Metropolitan Coins, 1380 Penobscot Building, Detroit, Michigan 48226.

SPECIALS: Scarce date Lincoln Cents. All good or better Satisfaction guaranteed. 50c each 1916S, 1927S, 1959D, 1955S. 75c each 1915, 1915D, 1921S, 1924S, 1932, 1932D, 1933. $1.00 each 1909VDB, 1913D, 1923S. $1.50 each 1911D, 1912D. $3.00 each 1913S, 1922D, 1931D, 1933D. $4.50 each 1910S, 1915S, 1926S. $5.00 each 1912S, 1914S. $10.00 each 1911S, 1924D. Bryson Inc., 612B White, Toledo 5, Ohio.

DEFY THE LAW OF GRAVITY

It stays suspended in air as long as you want: on your finger-tips, nose, toe, pencil point, table edge, on **Anything!**

DYNASTY CO.
8831 Sunset Blvd.
Suite 303
Hollywood,
California

SEND $1.00 WHILE SUPPLY LASTS!

IMPORTED
STILETTO POCKET KNIFE

ONLY $1.75

9" Overall Length
5" When Closed

- Opens instantly
- Sharp and Tough
- Stainless Steel Blade

Opens instantly — folding finger guard snaps into position automatically. Razor sharp tough stainless steel blade holds its edge for years of long hard service. A knife you will be proud to own. Guaranteed. Money back in five days if not satisfied. Send $1.75 plus 25c to cover postage and handling. NOT SOLD TO MINORS. Please state age.

WESTBURY SALES CO., DEPT. S-90
P. O. BOX 415, WESTBURY, N. Y.

A Hilarious Optical Illusion

X-RAY BINOCULAR SPECS

SHOW EXCITING MAGNIFIED CLOSE-UPS
Only $1.00

Scientific optical principle really works. Imagine, you put on your X-Ray Binocular Specs and hold your hand in front of you. Instantly you see the image magnified four times in area and you seem to be able to look right through the flesh and see the bones underneath. Look at your friend: is that really his body you see under his clothes? Loads of laughs and fun. Detailed instructions for a variety of exciting uses. **Send only $1 plus 25¢ post. Money back guarantee.**

HONOR HOUSE Lynbrook, N. Y., Dept. 97BY14

FREE Coins for Collectors. Long list and information only 25c. Gene Carlton, Chandler, Okla. 74834.

COIN Date Guaranteed. Restores Dates On Worn Nickels. $1.00 Per Bottle. Box 276-P, Morresville, N. C.

UNCIRCULATED, brilliant, scarce United States silver dollars over 70 years old, for only $3.00 each while supply lasts. Indian-head pennies, which are becoming scarcer every day. 10 different dates $3.00; 20 different dates for only $10.00. George Gregory, Box 156-S, Petoskey, Michigan 49770.

CLOSEOUTS! Early Indians to Dollars! Special List 15c. Nelson, 346-R, Rye, New York.

3 LINCOLN Cents, 1929D, 1919, 1923, plus Catalog only 10c. Approvals. Littleton Coin Co., Littleton W2, New Hampshire.

28 STAMP COLLECTING

U.S. Mint Specials! Flag Set Complete, $1.00; 1c, 2c, 3c Famous Americans (21 different), $1.00. Free list. Brooks, 2601 Avenue "U," Brooklyn 29, N. Y.

702 U.S.A.—25c (plenty commemoratives). Request Approvals. Horace Gatewood, Winston-Salem, N. C.

NUDES set (4)—Unusual Approvals 10c. Atlas, Plainfield, Racine, Wisconsin.

UNITED States commemorative collection containing 33 different—10c. Approvals. White, 516-W Avenue L, Brooklyn 30, New York.

225 STAMPS For only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange Countries cataloguing up to 25c each! Also Approvals. Mystic Stamp Company, Camden 55, N. Y.

PENNY Foreign stamps, neatly mounted in jumbo books in Scott order. Bullot Philatelics, 1454 Coney Is. Ave., Brooklyn 30, N. Y.

AMAZING Offer! 200 U.S. stamps—including commemoratives, airmails, high denominations to $1.00—only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

WORLDWIDE, 50 all dicerent, absolutely free—just to introduce our incomparable approvals. Kent Stamp Company, GPO Box 87, Brooklyn, N. Y.

25 Different U.S. Commemoratives 1893 Up 10c. Approvals. K&B Stamp Co., Box 70, Bklyn 23, N. Y.

80 DIFFERENT U. S. Stamps. Includes 1943 Flag Stamp of occupied Nations. Only 25c. Approvals included. Willett Co., Box 338-Y, Yorktown Heights, N. Y. 10598.

GIANT Stamp Collection including: Astronauts, Satellites, Moonrockets, Boy Scout issue, complete U.N. Set, recent Olympics and Sport issues from many countries, etc., Plus Big Stamp Dictionary and Approvals. Everything, 10c. Stampex, Box C7-RP, White Plains, N.Y.

EXCEPTIONAL 125 different, cataloging $3.00. Include triangles, commemoratives, 10c approvals. Reeves, Box 597P, Miami, Florida, 33137.

230 DIFFERENT U.S. Commemoratives $1.00. Approvals. H. Holub, 18 East 198th St., Bronx, N. Y. 10468.

FIPEX—Tipex—Cipex—Ashville Four miniature sheets used for $1.00 if you ask for our bargain priced U. S. approvals. Triboro, 38 Park Row, N. Y., N. Y. 10038.

50 YEARS Old, fifteen different United States, over fifty years old—10c with approvals Jaxon, Box 145-S, Brooklyn, New York 11230.

WONDERFUL Lincoln Diamond, Giant Roosevelt, 100 Others Different, 10c. Approvals. B. & G. Stamp Service, 114 West Washington, Sigourney, Iowa.

ONE Pound value Geo. VI Bermuda. Plus 100 worldwide—10c, approvals. Stevens, Box 105B, Homecrest Sta., Brooklyn 29, N. Y.

12 HITLERS, mint. 10c. Approvals. Galleries, Box 35291, Los Angeles, California 90035.

FREE! 222 Worldwide, 25c handling. Penny approvals. Jung, Box 46277, Los Angeles 90046.

PENNY Approvals, large selections. Premiums with purchases. Pennie Stamps, Orange, California 92669.

20 DIFFERENT Triangles 25c; Without Approvals. Pictures Stamps, Box 46193, Hollywood, California 90046.

STAMP Collecting Outfit 25c; Worldwide Stamps, Hinges, Detector, Gauges, Approvals. Lorain Brown, Marion, Michigan 49665.

1500 FOREIGN $1.00. 5,000 $3.00. 5,000 USA-commemoratives, airs, high values, revenues, 19th Century, etc. $3.00. No approvals. Meyers, 5321 Fleming, Richmond, California.

ENORMOUS variety old U.S. flags, famous Americans, Commemoratives with approvals, surprise packet. 10c handling. Metropolitan Stamps, Box 312 PS, Jackson Heights 72, N. Y.

RARE Stamp Free. Also new packet Aden to Urundi, with Kennedy, Triangles, Space, Sports, Ships, Dogs, Cats, Reptiles, plus others. All Free. Send 10c for mailing. Empire Stamp Co., Dept. PR, Toronto, Canada.

Copyrighted material

U.S. STAMPS. Giant Discount Catalog 25c. Raymax, 37-VX Maiden Lane, N.Y.C. 38.

FREE—Mint British Colonials from Antarctic Territory, Borneo, Brunei, St. Christopher, Nevis, Caymans, Trengganu, Pitcairns. Free with approvals. Viking, Great Neck 5, N.Y.

FREE—Mammoth Collection, $10,000 Airmail, World's smallest stamp, Scott's International, Master Global Albums given approval buyers. Bargain Stamps, Tustin, California.

HIGHEST Quality Stamps-Knob Handle, Index, Cherrywood Mount. $1 Postpaid. 24-hour service. Complete Satisfaction Guaranteed. Bjorklund's Stamp Shop, 3716 Corinth, Los Angeles, California 90066.

FLAGS—121 Free with Approvals. W. B. Stamp Co., Wilkes-Barre, Penna.

FREE — World's Greatest Premium — 5000 all different stamps, actual Catalogue value over $100.00 given approval buyers. Thrifty Stamps, Grossmont, California 92030.

7 DIFFERENT 3c commemorative plate blocks $1.00. Approvals. Gordon Davison, Henniker 5, New Hampshire.

FREE! Surprise "Mystery" packet. Approvals. Premiums. Dancer, B75-T60, Mansfield, Ohio.

VALUABLE Collectors' Items! John F. Kennedy commemorative envelope bearing portrait of famous President and highly-prized First Day Cancellation on his 47th birthday. PLUS Assassination Anniversary Cover postmarked officially with scarce November 22nd Dallas, Texas Cancellation! As an introduction to the World's Most Rewarding Hobby—Rush 25c for both historic Memorial Treasures. We'll also send fine stamps from our approval service returnable without obligation—plus FREE Collectors' Catalog and New Offers of JFK stamp issues just released! Kenmore Stamp Co., Milford KP-932, New Hampshire.

WORLD'S Most Rare Stamp—British Guiana #13. We do not have it but can furnish a facsimile for 10c to approval applicants. Capital Stamps, 10G, Ferrysburg, Mich. 49409.

UNUSED Queen Elizabeth stamps from Antigua, Caymans, Cyprus, Gambia, Mauritius, Montserrat, Saint Christopher, Sarawak, 5c. Approvals. Moumblow, 19B Cedarhill, East Northport, New York 11731.

PRICE List. U.S. No approvals. Stamps, 5000 Miami, St. Louis 39, Mo.

WOW! 1,000 Different Worldwide-Valued over $20.00 only $1.00 with quality approvals. Universal, Box 6, Kenosha 6, Wisconsin 53141.

QUEEN ELIZABETH on stamps—A beautiful collection of 50 different stamps from 22 countries—all bearing the portrait of the Queen of England. 10c with approvals. Roseland Stamps, Spring Lake 10A, Michigan.

BEAUTIFUL Topical Collection—Includes Olympic sports stamps, wild animals, bicolor triangles, colorful birds, outer space stamps, Poland kitten stamp and others. 10c with approvals. Sunny Stamps, Fruitport 10D, Michigan.

FREE!! Congo Triangle Set! Boy Scout Beauty! 25 others. Different. Approvals. Cambridge, Box 411, Cambridge, Ohio.

DEALER'S Wholesale Catalog. Postage 5c. Franksco, 5031 Queensberry, Baltimore, Maryland 21215.

FREE! Big Bargain Catalog—New Edition listing thousands of bargains including U.S. & B.N.A. stamps, packets, albums, accessories and supplies. Plus selections of fine stamps from our approval service, returnable without obligation. Jamestown Stamp, Dept. E26PS, Jamestown, N.Y. 14701.

315 DIFFERENT Worldwide Stamps, including multi-color John F. Kennedy Memorial Issue of Columbia, Russian space set, Communist propaganda, rockets, colorful big pictorials, high values, air mails, etc. Only 25¢. Other attractive stamps for sale on approval included. Capital Enterprises, P.O. Box 1914-PSA, Washington, D.C. 20013.

WOW! 110 All Different Germany 10c. Commemoratives, Airmails, High Values. Big catalog, bargain lists plus selections of fine stamps from our approval service, returnable without obligation. Jamestown Stamp, Dept. A26PS, Jamestown, N.Y. 14701.

100 OLD U.S. Stamps between 1861 and 1935 $1.00. Rousch Stamps, 51 Chestnut, Mansfield, Ohio.

OLD scarce U.S. seconds on approval. Slightly defective, bargain prices. Hearnfeld, Box 318, Irvington, N. J. 07111.

FREE. Triangle Souvenir Sheet with Approvals. Bargain mixtures. Beginners name requirements. Mountain City Stamps, Box 502R, Hamilton, Ontario, Canada.

CANADA Outdoor Recreation Set. 40c value, only 10c. approvals. Rheaume, 6591 11th Ave., Montreal, Canada.

FREE! 100 WORLDWIDE with penny approvals. 10c handling. Skytop, Box 1022-PS, Binghamton, N.Y. 13902.

FREE mint set—approvals accompany. Mintco, Box 22092, Memphis, Tenn. 38122.

U. S. UNITED Nations, Confederate States. Illustrated Price List Free. Stone, 260 Washington, Boston 8, Mass.

FREE U. S. Catalog. Mint SC= 740-9 $2.00. 756-65 $2.10. 859-93 $6.00. Simmy Co., 40 Court, Boston, Massachusetts.

SOUVENIR Sheets Czechoslovakia 1937 plus Japan 1947, 10c with Approvals. Kingman, 30 Empire, Yonkers, N.Y. 10704.

60 DIFFERENT U.S. (30 Commemoratives) 25c. No approvals. Seidenberg, Salem 169, Oregon.

PENNY Approvals! Regardless Catalogue! Kloster 4164—52nd Ct., San Diego 5, California.

FREE Surprise collection sent with approvals. Jay, 1784 Union, San Francisco, 94123.

SENSATIONAL Free Offer: 20 Different Outer Space stamps, selected approvals, Louis Morrison, Folsom, Pa. 19033.

GERMAN Commemoratives. 10c with approvals. Schaefer, Box 1704, Washington 13, D.C.

1000 FINE Mixed United States Stamps 25c. Wright's, Box 2122, Hagerstown, Maryland 21741.

10 DIFFERENT Presidentials 5c with beautiful US approvals. D & D Stamps, P. O. Box 245, Cape Cottage, Portland, Maine 04107.

123 DIFFERENT colorful stamps, 10c. Bargain approvals. Krehl, 1708 Nebraska, Orlando, Fla.

500 DIFFERENT Stamps, $1.00 with approvals. Smith, 508U Brooks, College Station, Texas.

FREE! 25 Egypt, 10c handling. Approvals. Bellet Stamps, Hazel Park, Michigan 48030.

UNITED STATES approvals. Select copies, used-mint. Kingsbury, Groton 1, Vt.

FREE Sample! Interesting Informative Illustrated. National Stamp News, Anderson, South Carolina.

40,000 DIFFERENT. Amazing new plan builds your collection systematically, country by country. As low as 50c weekly. Ware, Monroe 70, Conn.

FAR African Stamps—twenty-five different for fifteen cents with approvals. Florida Stamps, Washington Arcade, Orlando, Florida.

FREE! 29 thrilling jet, astronaut rocket, space, airmails. Send 10c handling. 2c approvals included. ABC World, Box 6000-WK, San Francisco, California.

MILLION Foreign Stamps! 2c each! Send for thrilling, giant approvals! ABC, Box 6000-ML, San Francisco 1, California.

50 DIFFERENT Old U.S. Revenue Stamps 50c. Winchester Stamps, Box 1592, Mansfield, Ohio 44907.

U. S. BARGAIN: 50 different 10c with beautiful world-wide approvals. Stamps, Kennebunk, Maine.

FREE 20 different U.S. with approvals. Bert Collier, Box 265, Chamblee, Ga. 30005.

FREE—Commemoratives, pictorials with Approvals. Wisehart, Dept. 8, 3105 West Broad, Columbus, Ohio 43204.

CHRISTMAS in February—Santa Claus set from Peru. 10c with approvals. Postmark, Great Neck 9, N.Y.

ATTRACTIVE—Mint Indonesian Pictorials. 10c with approvals. Bydahl, Box 1293-S, Seattle, Washington 98111.

200 DIFFERENT Worldwide 10c with approvals. Bydahl, Box 1293-SC, Seattle, Washington 98111.

U.S. APPROVALS. Low prices. Eagle, 2221 Romine Ave., Pittsburgh 26, Pa.

COLORFUL set free with unhinged approvals. Putnam Stamps, Mahopac, New York.

1c — 3c APPROVALS! Outstanding Worldwide Bargains! Carling, 266-B, Howard City, Michigan.

SPECTACULAR Clearance. Forty Different Packets, only $1.00. Norge, Ho-Ho-Kus, N J.

TEN Different Nudes: 20c. Approvals. Stamp Farm, 2S7, Oxford, Wis. 53952.

COLORFUL Bird Set Free! Approvals. Gorliz, Drawer 388CS, Park Ridge, Illinois.

COMMEMORATIVE United States stamps, better grade. 100 different only $1.00; 200 different $2.00; 300 all different only $4.00, a fine starting collection. George Gregory, Box 156-S, Petoskey, Michigan 49770.

1500 WORLDWIDE—$1.00. Bargain List —25c. Steele, Box 242-SS, Colorado Springs, Colorado 80901.

ATTRACTIVE Triangle set free! Request approvals. Cutlass, Box 235S, Chicago 60645.

FREE Surprise Packet with Approvals. Martell, Box 421, Westerly, R. I.

29 ANTIQUES, RELICS & INDIAN GOODS

TONS of Antique Gun Parts and Supplies. All Reproduction Muzzle Loading Guns. Send $1.00 for enlarged illustrated Catalog No. 115. Dixie Gun Works, Union City 13, Tennessee.

ANTIQUE & Modern Military Arms And Equipment. Largest selection of military goods in the East . . . guns, swords, edged weapons, hats, helmets, insignia, uniforms, books, medals and accoutrements. Large, fully illustrated Catalog—$1.00. ZM Military Research Co., Inc., Dept. PS, 80 Nassau St., New York, N.Y. 10038.

ARROWHEADS: 3—$1.00, 10—$3.30, "Peace" Pipe—$9.75. D. Licklider, Wentzville, Missouri.

SELLING 20,000 Indian Relics, Arrowheads, Spearheads, Etc. List Free. Lear's, Glenwood, Arkansas.

10 GOOD Arrowheads $3.00. Hundred $18.00. List Free. Hyde's, Box 1788, Santa Fe, New Mexico.

30 MINERALS & PRECIOUS STONES

EARTH Science Educational Magazine Subscription $2.50. Sample 35c. Box 550-PS, Downers Grave, Ill. 60515.

JADE Tie Tack. Rockhound catalog $1.00. Dalley, Box 405A, Driggs, Idaho.

U.S. and Foreign Minerals. Lists 10c. Hartmon, B98, Winston, New Mexico 87943.

20 GENEROUS Samples Ozark Mountain Mineral-Rock. $1.00 Postpaid. Allied Engineering, Rt. 2, Bland, Mo.

FOSSIL Fish valued to $1,000. Learn where and how to find them. Complete disclosure with photographs $6.50. J. Daczynski, 222-27 69 Avenue, Bayside, N.Y. Immediate refund if not satisfied.

ROCKHOUNDS—Gem Cutters—Jewelry Makers . . . new Free catalog—just off the press! Biggest supplier to hobbyists and craftsmen offers you tools, materials, equipment, introductory bargains and know-how. Free catalog . . . Write Grieger's, Dept. C-14, 1633 E. Walnut, Pasadena, California.

Copyrighted material

31 HOBBIES, COLLECTIONS

INTERESTING Hobby Magazine plus mail order opportunities 25c. Hobby Mail. Box 134, Clifton, New Jersey 07012.

MATCHBOOK Covers—110 Unused, all different, $1.00. List 10c. Harold Hamilton, 7150 South Cyril, Chicago, Illinois 60649.

INTRODUCTORY Five Military Emblems and Illustrated Catalog, 25c; Foreign Medal, 50c; 10 Military decals 25c. Hobbies, Box 71-M, Rockaway 94, New York.

32 PHOTO FINISHING, PHOTOCOPIES, ETC.

COLOR Movie Fans! 8 MM expertly processed for just $3.10 including fresh Kodachrome Film. All mailed back next day First Class. Craftsmanship guaranteed. Send exposed reel or request Free Mailers and Price List of complete services. Direct Mail Photo, Box 8352-PS, Pittsburgh, Pa. 15218.

WALLET Photos—25 for $1.00. Rush 25c. Better quality. Send any size photo. Returned. Pal Photos, Box 929, Chickasha, Oklahoma 73018.

OIL Coloring Photographs—A fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Free Book. National Photo Coloring School, 835 Diversey Parkway, Dept. 1722, Chicago (60614).

33 MOTION PICTURES & COLOR SLIDES

MOVIE Film! Free catalog! Eso-H, 47th Holly, Kansas City 12, Mo.

16 MM SOUND-Projectors, Films, New, Used for Sale. Free Catalog. National Cinema, 71 Dey Street, New York City, N. Y.

SAVE! Process your own movies at home. Free Catalog. Superior, 442-448 N. Wells, Chicago 10.

FREE Catalogues. 5,000 8-16MM Films. International-S Films. Greenvale, New York.

8mm. MOVIES, 2"x2" Color Slides—biggest selection anywhere! Hollywood classics, railroad, antique automobiles, circus, World War II, travel, wild life, many others. 16mm. films also. Big catalog free! Blackhawk Films, 15 Eastin-Phelan Bldg., Davenport, Iowa 52808.

16MM SOUND Features And Shorts. Bedner, 5300 So. Talman, Chicago.

34 CAMERAS, PHOTO SUPPLIES

PHOTOGRAPHY For Pleasure or profit. Learn at home. Practical basic training. Long established school. Free book. American School of Photography, 835 Diversey Parkway, Dept. 1722, Chicago, Illinois 60614.

35 MUSICAL INSTRUMENTS AND SONG WRITERS

SONG Ideas Wanted. Write with active, professional songwriters with publisher contacts. Records made. Share royalties. Send ideas—free examination. Songwriters' Associates, 236 W. 55 St., N. Y. 19-G.

POEMS wanted for new songs. Send poems. Crown Music, 49-P West 32, New York 1.

ACCORDIONS, Guitars, Band Instruments! Save to 50%. Famous makes. Easiest terms. Trades accepted. Free home trial. Free discount catalog. Mention instrument. International Music Mart, 5535-P Belmont, Chicago 60641.

VIOLIN and Guitar makers—send for latest Free Catalogue of woods & accessories. International Violin, PS2, 414 East Baltimore St., Baltimore 2, Md.

POEMS wanted for songs. Royalties. Tin Pan Alley, 1650 Broadway, New York, N.Y. 10019.

SONGWRITERS: Protect your ideas! Write for Safe Procedure! We serve Top Hit Writers in N.Y. Dept. P-4, Superior Song Service, 545 Fifth Ave., New York, N.Y. 10017.

TAPE THIS AD TO THE BACK OF YOUR TV SET

ALL TV-RADIO RECEIVING TUBES $1 ea.

ALL BRAND NEW, all at a flat discount price of only

No exceptions . . . all tubes $1, regardless of list price. Virtually all types available, including new color tubes.

- **All Tubes 1st QUALITY MADE IN U.S.A.**
- **All Sold on Written 24-MONTH WARRANTY**
- **All Orders SHIPPED 1st CLASS SAME DAY REC'D.!**

• If you know for sure which tubes are defective, order them @ $1 each, plus 25¢ postage and handling on your entire order.

• If uncertain which tubes need replacing, send for our FREE leaflet "How To Save On TV-Radio Repair Costs." This valuable leaflet should be taped to back of your TV set, and kept handy . . . 'cause tubes are sure to go! Write today to, Dept. PS-26.

UNIVERSAL TUBE CO.
Ozone Park, N. Y. 11417

"PRACTICAL Violin Making" with patterns $2.00. Supplies. Chelsea Fraser, 2025 Stark, Saginaw, Mich.

GUITAR, Banjo Making, books, plans, wood, necks, tools. List 15c. Wildwood, 510 East 11th Street, New York 9, N. Y.

SONGS, Poems Wanted! Accepted songs published, recorded at our expense! Ted Rosen, 17-PS Longwood Road, Quincy, Mass.

PLAYER Piano Books. Send for free catalog. Vestal Press, Vestal 8, N. Y. 13850.

INCOME guaranteed two years for songpoems accepted! Free public releases! Castle's, 203-PS West 46th St., New York City 36.

GUITARS $11.95. Electric Double Pickups with Tremelo Bar $49.95. Any make on hand. Amplifiers $27.50. Accordions $125.00. Concertina $350.00 Drums, 3-Piece Pearl Set $99.00. Wind Instruments $49.95 up. Write Information. Melody Music, 4951 W. 95th St., Oak Lawn, Ill.

RECORDING Stars need Lyrics for hit records. Rush poems. Kalin Twins Studio, Woodward Building, Washington, D. C.

SWISS Musical Movements. Mechanical-Electrical. Spielman, 131 West 42nd, New York 10036.

POEMS Wanted for new songs and records. Send poems. Five Star Music, 6H Beacon, Boston 8, Mass.

ELECTRIC Guitars, amplifiers, wholesale. Free catalog. Carvin, PSM, Covina, California.

SONGPOEMS Wanted. Send Poems For Offer. Nashville Music Institute, Box 532-PS, Nashville, Tennessee.

NEW and used Professional Guitars, amplifiers, drums. Bulletin 25c. Hill, 3526 California, Peoria, Ill.

SONGWRITERS! At last, the book just for you! "The Language of the Music Business (Its Customs, Practices and Procedures)." Over 460 pages jampacked with information you have long needed. 3,477 entries! Only $12.50, postpaid. Del Capo Publications, Inc. 800 Horner Ave., Nashville, Tenn. 37204.

35A PHONOGRAPH RECORDS

DISCOUNTS on all LP's. Free details. Citadel Record Club, 545 Fifth Ave., Dept. 3, New York 17, New York.

2,500 UNUSUAL Hobby, Party Records, Others; Free Catalogue. Rose's Records, 300 Chelsea, Louisville, Kentucky 40207.

RECORD Jackets. Replace old, torn, dirty LP covers with clean, glossy, pure white jackets. Inner sleeves available. Free details or send 50c for samples. Cardboard Co., Room 804, 89 East Woodruff, Columbus, Ohio.

35-55% off LP's Disclub, 1 Fisher Drive, Mount Vernon, N.Y. 10552.

36 RADIO, TELEVISION, ELECTRONICS, HI-FI

STEREO Tapes. Save up to 60% (no membership fees, postpaid anywhere USA). Free 60-page catalog. We discount batteries, recorders, tape accessories. Beware of slogans "not undersold," as the discount information you supply our competitor is usually reported to the factory. Saxitone, 1776 Columbia Road, Washington, D.C. 20009.

TAPE recorders. Hi-Fi components. Sleep Learning Equipment, tapes. Unusual values. Free Catalog. Dressner, 1523 Jericho Tpke., New Hyde Park 1, New York.

SLEEP-LEARNING Kits—endless tapes, timers, complete outfits. Catalog free. SLRA, Box 24-SB, Olympia, Washington.

33c TUBES, Radio & TV! Free List. Cornell, 4217-S University, San Diego 5, California.

McGEE Radio Company. Big 1966 catalog sent free. America's best values, Hifi-Amplifiers — Speakers — Electronic parts. Send name, address and zip code number to McGee Radio Company, 1901 McGee St., Dept. PSM, Kansas City, Missouri 64108.

FREE—Free—Free—Free—Free—Free—Free. Send in for your Free one year subscription to Olson Electronics' fantastic value packed catalog—unheard of low, low prices on brand name speakers, changers, tubes, tools, stereo amplifiers, tuners, CB and other values. Credit plan available. If you have a friend interested in electronics send his name and address for a Free subscription also. Olson Electronics, Inc., 461 S. Forge St., Akron, Ohio 44308.

NEW Mfrs. B. S. R. record changers, UA15 model with stereo cartridge $13.00 each. Parts guaranteed or units exchanged. Quantity discount. Changers, Box 144 Jerome Ave. Station., Bronx, N.Y. 10468.

FREE Electronics Catalog. Tremendous bargains. Electrolabs, Department C-636A, Hewlett, New York 11557.

SAVE money on TV and Radio repairs. Free catalog. Telefixit, Box 714-PS, Manhasset, N. Y.

FREE List Servicing Books. Thomas Garber, 104 Ashley Street, Korn Krest, Wilkes-Barre, Penna.

CONVERTER Automobile radios, receive police, fire calls. 30-50 or 100-200 kit $5.00. Meshna, Lynn, Mass. 01901.

KITS. Crystal Radio $1.25, Solar Powered Radio $3.95, Wireless Transmitter $3.95, Lectronix, Box 42, PS3, Madison Heights, Michigan 48071.

ORIGINAL government cost $1.92 each; 2 gold plated crystals for .25, 10 for $1.00 postpaid. Selectronics, The Plains, Ohio 45780.

37 BUSINESS OPPORTUNITIES

PACKAGE at Home For Profit! We Supply everything. No "selling." Free Home Business details. HPC, 807-HSH Sunset, Los Angeles 12.

BUILD Custom Cases at Home For Profit. Get orders by Mail. We Supply materials, instructions, everything. Free Home Business details. Customcase, 805-CSH Sunset, Los Angeles 12.

$100.00 WEEKLY spare room. Raise redworms odorless, soilless way. Charlie Morgan, Box 116-C Bushnell, Florida.

EARN Money raising fishworms for us! Write: Oakhaven-42, Cedar Hill, Texas.

WORK home, mailing our catalogs! Free details! Cam Company, Dept. 213, Verona N.J.

FREE! 128 Page Illustrated Catalog. More than 2,000 Name Brand Items; below wholesale prices. Sell full or part time. Save hundreds of dollars on purchases for yourself! Watches, jewelry, cameras, radios, phonographs, tape recorders, appliances, housewares, cookware, hardware, power tools, luggage, musical instruments, sporting goods, toys, many others. 8 floors of Name Brands. Orders shipped within 24 hours. Continuous supply. Send for free catalog now! H. B. Davis Corp., Dept. PS, 145 West 15th Street, New York, N. Y. 10011.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

PIANO Tuning learned quickly at home. Tremendous field! Musical knowledge unnecessary. Information free. Empire School of Piano Tuning. Box 327, Shenandoah Station, Miami, Florida. 33145. (Founded 1935.)

"STREAMLINED Home-study Mailorder Course." $2.00. Twenty-four complete lessons. Dealers wanted. Sample imprint circular free. Neil H. Tasker, Shamokin, Pennsylvania.

IMPORT-Export opportunity, profitable world-wide, mail-order business from home, without capital; or travel abroad. We ship proven plan, for no risk examination. Experience unnecessary. Free details. Mellinger, Dept. X692, Los Angeles 90025.

FREE Report, "Businesses You Can Launch At Home". Immediate earnings! Wyman Enterprises, B-36, Congers, N.Y. 10920.

INSTALL burglar alarms without previous experience or costly equipment. Big profit. Free details. Nasco, 11071 Massachusetts, Dept. X692, Los Angeles 90025.

ANNOUNCING Home Study Course in commercial baking. Practical basic training. Good field for those with aptitude. Free book, "Opportunities in the Baking Industry". National Baking School, 835 Diversey Pkwy., Dept. 1721, Chicago (60614).

WANT To Make Big Money At Home? $10.00 profit in an hour possible with Invisible Mending. Make tears, holes disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details Free. Fabricon, 1535 Howard, Chicago, Ill.

LIQUID Rubber Plastercraft Supplies. Plouffe's, 82A Pleasant Street, Worcester, Massachusetts.

FREE "Franchise Profit Letter" tells how unique NFR service is helping thousands seeking profitable businesses. Write today. National Franchise Reports, PS-528, 333 North Michigan, Chicago 1.

SELL Advertising book matches. Write us today; we put you in business by return mail; handling complete line ad book matches in demand by every business right in your town! No investment; everything furnished free! Top commissions daily! Superior Match, Dept. PX-266 7530 S. Greenwood, Chicago, Ill. 60619.

START own business! Booklet shows you how! Only 10c. Popular Mechanics Classified, Dept. S-5, 575 Lexington, New York. 10022.

FREE Booklet! Profitable spare-time business Bronzing, PearlKoting baby shoes! Complete set-up on credit. Kiktavi, Box 34861-G, Los Angeles, California 90034.

VENDING Machines—No Selling. Operate A Route of Coin Machines and Earn Amazing Profits. 32-page Catalog Free. Parkway Machine Corporation, 715 PSB Ensor Street, Baltimore 2, Maryland.

IMMEDIATE Profits with no capital or experience. Take orders for all magazine subscriptions. Friends and neighbors are your prospects. Write now for complete free kit. McGregor Magazine Agency, Dept. DB5, Mount Morris, Illinois.

MAIL Baby Catalogs to new mothers! Profitable! Northland Enterprises, Rhinelander, Wisconsin.

MAKE BIG MONEY in MAIL ORDER

Make up to **$10,000** a year from your own home in spare time in fascinating mail order business. Learn secrets, facts & get advice to start you with all the **"KNOW-HOW"** you need. Instructions prepared by Casper Pinsker, dean of mail order. Learn everything that has brought success to others & will succeed for you, too. Learn how hobbies can be turned into successful mail order sellers. You might have marketable gadgets you invented for your garage, kitchen, garden or cellar. You might have ideas for using old boxes or cans & making toys or musical instruments. You get list of manufacturers who will drop ship their merchandise for you on your own label. Endless ways to get into mail order. Learn how! Order copy of Encyclopedia of Mail Order in Capsule Form. Only $3.00. Money back if you don't think it worth 10 times the price. Send today. **JERRY ELLIOTT, Dept. PS, Box 1918, Grand Cent. Sta. NY 10017.**

SECRETS! Secrets! Mail order success revealed by internationally famous expert who discovered how to make home business fortunes. Beginners: Get free copy "How to Make Money in Mail Order." Discloses free advertising, profitable products, everything! No obligation. Write Mailco, 1554 Sepulveda, Dept. X692, Los Angeles 90025.

WORLD'S Biggest Wholesale Supply. Buy from 10,001 U.S.A., European, Japanese and Hong Kong Wholesalers. Many below wholesale! Have your own imprinted Catalogs Free Details. Bargainhunters Opportunities, Box 730-B, Holland, Michigan 49424.

COOPERATORS Wanted for newly proposed noncompetitive proposition. Ornsteen, Du Quoin, Ill. 62832.

OPERATE Restaurant or Diner. Free booklet reveals profitable plan. Write Restaurant Business School, Dept. FC-26, 1920 Sunnyside, Chicago, Illinois 60640.

$15,000 YEAR Guaranteed (Minimum). Distinctive, Exclusive, Non-Competitive. Patent Pending. $2.00 Brings descriptive Booklet (Returnable). Minimum investment, Results or Money Back. Write: Executives, P.O. Box 4080, New Orleans, Louisiana.

DRAFTING Pays Big Money! Learn at home with professional equipment, pay later. Free Book. Christy Trades School, Dept. 901, 3214 W. Lawrence Ave., Chicago 60625.

EARN Money In Your Spare Time repairing appliances, housewiring, motor rewinding, electrical maintenance. We show you how, send 8 trouble shooting instruments, business-getting materials. Free book. Advance Trades School, Dept. E-805, 5944 Newark, Chicago 60631.

IMPORT-EXPORT Business Made Easy. Complete setup service. Not just instructions. Hermes, 152 West 42, New York City 10036.

INVESTIGATE Accidents. Earn to $1,400 monthly, part or full time. Pick own location. Car furnished. Expenses paid. No selling. No college education necessary. We train you at home spare time. Keep present job until ready to switch. Men urgently needed now. We place far more men in this booming field than any other individual company, or school. All facts Free. Write: Universal, CPS-102, 6801 Hillcrest, Dallas, Texas 75205.

SAVE Time! New Mailorder-Publications Directory lists 100 publications, actual publishers, prices, classifications, etc. $1.00. Guaranteed! Bart Seidler, 7616 Fairchild, Milwaukee, Wisconsin 53217.

TREMENDOUS Profits in Mail Order. No gimmicks. Free details. Cardon, Box 17071-PS, Memphis, Tennessee 38117.

FREE $13.00 Bookkeeping Set For Small Businesses. Lasts year. Send $1.00 for shipping. Tax's Forms, Inc., Box 4039, Columbia, S.C.

LAST Chance! Profitable opportunities. Rush $1.00 cash. Terry, Route 2, Box 739, Greensboro, North Carolina.

IMPORT Outstanding novelties, gifts, gifts, premiums, from Formosan manufacturer. Sensationally low priced. Twelve different samples and many offers, $2.00 money order. Satisfaction guaranteed. Free information. Taiwan Variety, Box 24029-PS, Taipei, Formosa.

LEARN landscaping and the growing of plants. Start a profitable business part or full time. Free information without obligation. Lifetime Career Schools, Dept. PSC-26, 11826 San Vicente Blvd., Los Angeles, Calif. 90049.

PROFITABLE mailorder business of your own! Write: Ormiston, Stockport, Ohio 43787.

OPERATE Collection Agency "Little Gold Mine!" Franklin Credit, Roanoke, Virginia.

DEALERS Wanted. High Demand Item. Suite 408, 948 Market, San Francisco, Calif.

$2000-$3000 IN Sparetime. Operate Insurance Investigation Agency. $1.00. Watkins, Lee Street, Leesville, South Carolina 29070.

BAKE New Greaseless Doughnuts In Kitchen. Sell stores. Free recipes. Summers, 3605 South 15th Minneapolis 7, Minnesota.

SELL Books By Mail. 400% Profit. Royal, Box 450-M, Cleveland 27, Ohio.

CONCRETE Facts: Cement artists make big money at home. Simple equipment. Experience unnecessary. Copyrighted methods. Easy to make unlimited cement pottery designs, bird baths, wishing wells, rustic gardens, patio items, etc., without molds. Formulated, chemical coloring, marbleglazing. Free illustrated brochure. Hollywood Cementcraft, 602 E. Athens, Altadena, California 91001.

INCREASE Income! Repair small appliances with new Tester. Details free. Craft, Box 606C, Westfield, New Jersey.

WORLD'S largest wholesale supply. Buy from 7853 American, European, Japanese wholesalers. Hongkong tailormade suits. 123 dropship catalogs. Rockbottom prices. Automobiles. Free details. International Buyers, 216-PS2, Jackson, Chicago 2, Illinois.

SPARE Time Earnings. With your Tablesaw, Bandsaw or Jigsaw. Write: Workshop, B3800 Harney, Vancouver, Washington 98660.

READING Tutors earn $5 to $10 hourly. Learn at home. No educational requirements. Free Information. Reading Arts Academy, Dept. PSC-26, 1100 West "Q," Wilmington, California.

MEN—Women—"Everybody Likes fine candy." Make professionally home . . . (Our 51st Year.) Ragsdale Candies, East Orange, New Jersey 07019.

MAKE Money Raising Large Fishworms. Details Free. Blevins, Ranch-1, Stevenson, Alabama.

EARN $1,000.00 month operating Bookkeeping Tax Service. Universal, Box 664-P, Springfield, Missouri.

YOUR own home business. Interesting, Profitable, Different. Details free. T. Richey, 441 East Main, Greenville, Ohio 45331.

OPERATE Home mailorder business. Vosacek Printing, 4444-PS Ute, San Diego, Calif. 92117.

CEMENTCRAFT — plastercraft for pleasure and profit Sample, catalogue 10c. Wooley Company, Box 29-D, Peoria, Illinois.

$60.00 DAY, manufacturing Concrete Posts. Carlane, 1803 Fremont, Rapid City, South Dakota 57704.

$70 WEEKLY—Home spare time. Simplified mail bookkeeping. Immediate income—easy! Auditax, 34741D, Los Angeles 90034.

MAKE $46 From Square Foot Plywood; Jigsaw necessary. Free Details. Woodarts, Bridgewater, Mass.

CARTOONING and commercial art. Easy home-study drawing course. Art background not necessary. Excellent creative money making opportunities part or full time. We show you how. Low monthly tuition. Free booklet. Continental Schools, Dept. 6A-4, 1330 W. Olympic Blvd. Los Angeles, Calif. 90015.

Copyrighted material

MAKE $32 from 49c piece vinyl. PS-1834 Edgeland, Louisville, Ky. 40204.

$15.00 HOURLY Profit-Own Business with one serviceman. Quickly learned. Easy to do. Operate from home. Few hundred dollars builds your own nationally advertised business while continuing present job. Investigate immediately . . . before your territory is taken. Free booklet explains everything. Send today. Then decide. Duraclean, C6-182, Duraclean Building, Deerfield, Illinois.

COMPLETE mail order setup for beginners. Terrific sellers. No investments. We dropship. Sensational profits. Universal Enterprise, Brown Hill, Ontario Canada.

SELL paint-by-number wall mural kits. Nationally advertised line demanded by 140,000 Hobby, Paint, Dept. Stores. $18 billion "Do-It-Yourself" market. Big party plan, door-to-door business. Free Giant catalog business plan. Murals, Box 883, Tarzana, Calif. 91356.

VENDING Machine catalog. Big profits no selling. Rake, 1214 West Girard Avenue, Phila., Pa. 19123.

ESCAPE jobs forever. Retire securely now. Details free. Thacker, 220 South Mission Ridge Drive, Rossville, Ga. 30741.

"HOW I Made $1,000,000 in Mail Order" by Joseph Cossman. 240 page book tells how to build profitable mail order business, $5.95 plus 25c postage. How to Become a Successful Manufacturer's Representative by Marvin Leffler, 218 page book $6.50 plus 25c postage. How to Make Profits in Real Estate by Clyde Cadwallader, 224 page book $6.95 plus 25c postage. Granville's New Key to Stock Market Profits, 352 page book $12.50 plus 25c postage. World Wide Gifts (Book Dept. PS2) P.O. Box 2917, Long Beach, California 90801.

OPERATE Home Importing Business—Details—Importico, Box 5332, North Charleston 2, S.C. 29406.

BE Loan Broker! Funds Furnished. Set-Up $1.00. Brokers, Dansville, N.Y.

FREE Tips On Getting Loans & Capital. No obligation. Write: National Counselor, Harlingen 3, Texas.

AMAZING Profits raising fishworms. Write: Tuff, Center Ave., Chesilhurst, New Jersey.

LEARN Bonsai! Duplicate exactly $500 imported Oriental Tiny Trees in few hours! Grow living Miniatures too: and tiny forests in bowls. Profitable Home Business! Request Free Fact Pack. Free Sample Seeds! Minitree, Box 23023-XU, Los Angeles 90023.

200% PROFIT — Fantastic "Dollar Matching" Plan assures Mail Order success! Free Details. Nichols, Box 296, Port Richey, Florida 33568.

START Profitable Mailorder Business! Vikari's 835-PS, First Avenue, Salt Lake City, Utah 84103.

EARN $10,000 Selling Books By Mail: Box 51-Z, Des Plaines, Illinois.

VACUUM Form at home! Mold plastic products for big profit. Fabulous new machineryless method. Free facts. Nationwide Plastics, Box 23321MZ, Los Angeles, Calif. 90023.

EARN extra money selling advertising book matches. Sample kit furnished. Matchcorp, Dept. PS-26C, Chicago, Ill. 60632.

ALL Types of businesses coast to coast. Over 350 local offices to serve you. Write for Free "Business and Income Property Bulletin". United Farm Agency, 612-PS West 47th St., Kansas City, Mo. 64112.

PLASTERCRAFT molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Jayhawk Plasters, Blue Rapids, Kansas.

FREE Book "990 Successful, Little-Known Businesses." Fascinating! Work home! Plymouth-952T, Brooklyn, New York 11218.

I MADE $40,000.00 Year by Mailorder! Helped others make money! Start with $10.00—Free Proof. Torrey, Box 3566-F, Oklahoma City, Oklahoma 73106.

MAKE Money mailing our postcards! Work home, full, sparetime. Particulars 10c. Westlee, Western Springs 2, Illinois.

Make Money Writing
SHORT PARAGRAPHS

No tedious study. I tell you what to write, where and how to sell, and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell, right away. Send name for free facts.

BENSON BARRETT, Dept. C-86-B
6216 N. Clark St., Chicago, Ill. 60626

ARNOLD PALMER offers you unequalled opportunity to profit from tremendous popularity of golf and power of Palmer. Highly profitable exclusive Palmer Golf Franchises available. Complete National program. Hefty profits—minimum investment. Write for details. Arnold Palmer Enterprises, Dept. CP, Pleasantville, New Jersey. Tel. 609-646-3500.

FREE Literature — Make Big Money Raising Fishworms and Crickets. Carter Farm, Plains, Georgia.

38 MONEYMAKING OPPORTUNITIES

AMAZING successes through franchises! Become exclusive franchise holder your territory. Information rushed. National Franchise Reports, SP-528, 333 North Michigan, Chicago 1.

FREE facts and descriptive bulletin. Be an Air Conditioning, Refrigeration, and Heating serviceman. High pay, jobs open everywhere, operate your own service business, no school or correspondence necessary. Write Doolco Trouble Shooter, 2016 Canton, Dallas, Texas.

FREE! World's Greatest Mail Order Medium! Bargains Galore! Business Opportunities, etc. Popular Mechanics Classified, Dept. W-1, 575 Lexington, New York 10022.

DETECTIVES — Excellent opportunities —Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 10024.

VENDING Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-page Catalog Free. Parkway Machine Corporation, 715 PSM Ensor Street, Baltimore 2, Maryland.

MAKE Big Money taking orders for Stark DWARF Fruit Trees. Everybody can now grow Giant Size Apples, Peaches, Pears in their yards. Also Shade Trees, Shrubs, Vines, Roses, etc. Outfit Free. Stark Bro's., Desk 30126, Louisiana, Missouri 63353.

EARN Big Commissions Full or Part Time. Show America's largest line Low-Priced Business Printing and Advertising Specialties Plus big catalog Union Label Political Advertising items. Calendars in season. Big Free Sales Kit samples hundreds items used daily by businessmen and political candidates. Merchandise bonuses for you. Free gifts for customers. Build profitable repeat business. Start now. National Press, Dept. 149, North Chicago, Ill.

FREE. 206 Easy ways to make money taking orders for exciting new products—spare time. Send name, age for 5 months free subscription. Opportunity Magazine, 850 N. Dearborn, Dept. 18-AM, Chicago.

MINK raising information free. Lake Superior Mink Farm, Inc., Superior, EE5, Wisconsin 54882.

WATCH Repairing. Swiss and American watches. Develop skill step by step in spare time at home. Tuition only $5 monthly. Diploma awarded. Free sample lesson. Chicago School, Dept. WBA, Fox River Grove, Illinois 60021.

CLIP items from daily newspapers. Get $1.00 to $5.00 each. Details free. Walter, Box 1023-S, Erie, Penna.

FREE Trial! Let Me Send You Food and Household products to test in your home. Tell your friends, make money. Rush name. Blair, Dept. 55CB, Lynchburg, Va.

BECOME State Notary. Important position. Extra income. Free Details. Write: Exchange, Box 37, Seattle, Washington 98111.

MONEY Making Information. New Products. Unique Bargain Offers. Mail-O-Mart, Box 1256, Spokane, Washington 99210

HOMEWORK Opportunities! 100 companies begging for sparetime homeworkers! Complete list, instructions, $1.00. Brugenheimer Publishers, Box 158-AG2, Lexington, Mass.

"HOW To Make Money in the Land Business Without Too Much Effort." Literature available—25c. Al Chatel, Box 482, Kirkland, Wash.

MAKE money running your own restaurant. Information free. Write Dept. PS-9, Restaurant Management Institute, 3854 N. Sawyer, Chicago, Ill. 60618.

YOUR Name on 10,000 "Big Mail" listings for moneymaking opportunities, offers, bargains. Just $1.00! Mission Services, 422 W. Loockerman, Dover, Delaware 19901.

WANT to make money in Mail Order? Subscribe to Progressive Mail Trade—sample free. Howard's, 28 East Jackson, Suite 1204-PS, Chicago 60604.

"THE Money-making opportunities in Insurance Stocks"—booklet for investors—$1.00. Valuable 1966 Investors Almanac included Free. Jade Publishers, Box 746-PS, Minneapolis 55440.

LEARN The secrets of repairing junk batteries. "Fabulous Profits" at home. Details: Batteryman, P.O. Box 416, Palm Desert, California.

MAKE Up To $50.00 Daily Soliciting Delinquent Accounts. Terrific Commissions. General Finance Co., Dept. LG-89, Pickwick Bldg., Kansas City, Mo. 64106.

EXCLUSIVE 77 page Mail Order Guide on sale. Profitable Business Building information. Buchwalter Sales, 834-175th St., Dept. 25, Hammond, Indiana 46324.

$500 Monthly Possible Talking to Friends, Nationwide, Box 104, Federalsburg, Maryland.

EARN Extra Money Easily—Enjoyable. Homecraft's 40-21PS Bell, Bayside, N.Y. 11361.

3 BATTERY rejuvenator secret formulas —$2.00 Batteryman, Box 416, Palm Desert, California 92260.

I Made $50 Day in my Ad Market. Helped others start. Free details. Ad Market, Harlingen 6, Texas.

CIGARETTES—Make 20 plain or filter-tip for 10c. Facts free. Moberly, Box 923, Owensboro, Kentucky.

MAKE Money Writing Short Paragraphs! No tedious study! I tell you what to write, where and how to sell, and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell, right away. Send for free facts, Benson Barrett, Dept. C-86-A1, 6216 No. Clark, Chicago 26.

FREE Literature — Make Big Money Raising Fishworms and Crickets. Carter Farm-11, Plains, Ga.

38A BUY IT WHOLESALE

BARGAINS! Buy Wholesale! Save Money! Free Catalog! Norris, Dept. 116, 273 Merrick, Lynbrook, N. Y.

NEW 6-color Deluxe below wholesale catalog. Automobile catalog and others. Housewares, clothing, furs, furniture, appliances, refrigerators, washers, dryers, vacuum cleaners, polishers, cookware, dinnerware, strollers, cribs, radios, stereos, phonographs, records, musical instruments, organs, typewriters, books, binoculars, luggage, sporting goods, bowling, golf, game tables, motor scooters, motor golf carts, power mowers, chain saws, boats, motors, bicycles, clocks, watches, diamonds, jewelry. Huge discounts, hundreds name-brand items. For free list (factory prices) postcard: Selbyco-6, Decatur, Illinois.

BARGAINS! Buy Wholesale and Below! Name Brands. Appliances, Furniture, Sports Equipment, Televisions, Cameras, Watches, Jewelry, Thousands More. Huge Discounts to $1,000.00 on New Automobiles. All Makes. Free Details. Write To-MONEY Making Information. New Prod-730-B. Holland, Michigan.

ELECTRIC Guitars, amplifiers, wholesale. Free Catalog. Carvin, PSW, Covina, California.

Copyrighted material

WORLD'S largest wholesale supply. Buy from 7853 American, European, Japanese wholesalers. Hongkong tailormade suits. 123 dropship catalogs. Rockbottom prices. Automobiles. Free details, International Buyers, 216-PS Jackson, Chicago 6, Illinois.

100,000 Products wholesale! Tremendous selections! Fantastic savings! Nationally advertised merchandise! Also closeouts imports! Free details! Wholesalers, 1265-PS. Broadway N.Y. 1, N.Y.

38B IMPORT-EXPORT

IMPORT direct from Japan, Europe. Information free. Edmonds, 2917 Chamberlayne, Richmond, Virginia.

SWISS Electric Razor $5.75. Zodic Radio $8.00. Electric Tooth Brush $5.00. D. Nichols, 1877 Ferber Ave., Memphis, Tenn.

39 FORMULAS, PLANS, ETC.

FORMULAS—All Kinds. Amazing Big Catalog 10c. Kemisco, Park Ridge 15, Illinois.

LATE Modern Manufacturing Formulas List Free. Chemical Service, Martville, New York.

PROFITABLE Manufacturing Formulas. Booklet free. Pontesso, 2625 South Eighth, Terre Haute, Indiana.

SKYROCKETS, Fireworks, Manual, 100 Formulas, $2.00. Skymail, Box 874-AA, Sunnyvale 88, California.

MAKE your own products. Details free. McDaniel, 17886 Jos Campau, Detroit 12, Michigan.

ENCYCLOPEDIA of formulas, processes, trade secrets. Details free. Cassell, Box 1535, Eugene, Oregon 97401.

MAKE your own Rust Remover for 10c a gallon. Formula, instructions $1.00. Tradewind, Box 57-B, Tekonsha, Mich. 49092.

FOR Proof Of What You Can Do In Specialty Manufacturing Get Our Literature. It's Free! Miller—Chemist, 1517-A, Tampa, Florida.

WINEMAKERS! Shortcut method for making delicious wines. $1.00. Aqua-Jets Company, Florence, Kentucky.

40 PLASTICS

NEW Liquid casting plastic, clear, colors. Embed real flowers, butterflies, photos, coins. Send 25c for two handbooks "How to Cast Liquid Plastics" and "How to Make Extra Money at Home." Castolite, 66-102B, Woodstock, Illinois.

NEW! Low priced plastic laminating machines & supplies. Details. Burr, 7645 Oakland, Kalamazoo, Mich. 49002.

PLASTIC Embedders, Jewelry Workers, We have everything. Moulds, Findings. New Catalog 25c. David Co., 861 Broad St., Dept. F Providence 3, R. I.

41 SCIENCE & CHEMISTRY

ROCKETS. New Illustrated Catalog 25c Single And Multistage Kits, Cones, Engines, Launchers, Trackers, Technical Information, Etc. Fast Service. Estes Industries, Penrose 6, Colorado.

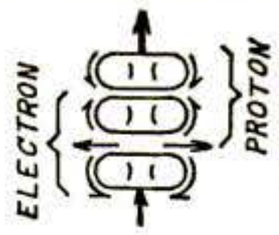
AMAZING New Book Of Science Experiments, formulas and Catalogue of Laboratory Supplies. Only 35c. National Scientific Co., Dept. PS-2, 13 S. Park Avenue, Lombard, Illinois

FIRE Ink writing burns. Formula 25c. Import, P.O. Box 71, Pottsville, Pa.

FREE 3 Pyrex Test Tubes With Purchase $4.00. Catalog 25c. Chemicals, Apparatus, Biology. Mid-States Scientific, 7053 N. Clark, Chicago, Ill.

FREE! Two 17" x 22" color science charts when ordering illustrated science catalog: Chemicals—glassware—apparatus. Send 10c. Lionel-Porter, Box 980-B, Hagerstown, Maryland 21740.

CONTACT Explosive: Explodes with touch of feather. Handled safely wet. Powerful. Ideal for jokes. Applies like paint. Made from household chemicals. Results guaranteed. Complete instructions $1.00. Franks Scientific Company, P. O. Box 156, Martelle, Iowa 52305.



VORTEX atom booklet on the real atom which has no nucleus and no orbital electrons.

Third edition, 25 cents.

C. F. Krafft, 4809 Columbia Road Annandale, Virginia 22003

ROCKETS! Flight Kits. Test Equipment. Catalog 25c. Rocket Development Corporation, Route 3, Seymour, Indiana 47274.

PUSHING-Rebounding gravitation theory $1.00, refundable. Carnahan, 4407 Avenue H, Austin, Texas.

UNUSUAL Chemistry courses, kits! Information booklet, 25¢. National, Box 94, Redwood City, Calif. 94064.

UNDERWATER Fuse 3/32" diameter 60 feet with formulas, instructions, $1.00 postpaid. 125 feet $2.00. Wayno, Box 182-A, Addison, Mich.

ROCKETS. New 1966 designs. Single, multistage kits, engines, ignition materials. Bargains! Catalog 25c. Central Rocket Company, Waupaca, Wisconsin 54981.

CHEMICALS and apparatus for industrial, analytical and private laboratories. Catalog 35c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

13 CHEMICALS—Formulas—Fuse. All for $5.00 Postpaid. S & C Labs, 21863 Colgate, Farmington, Michigan.

ILLUSTRATED Catalog; Chemistry, mineralogy, biology 25c. Tracey Laboratories, Evanston, Illinois.

ROCKET Liquid and Solid Propellant. Catalogue 25c. Hardan Manufacturing, Box 453, Chicago Heights, Ill.

LABORATORY conversion charts with discounts Catalogue—25c. Hagenow Laboratories, Manitowoc, Wisconsin 54220.

UNDERWATER Fuse—63 feet $1.00 Postpaid—plus pyrotechnic catalogue. Christie, Box 85, Bergenfield, New Jersey 07621.

AMATEUR Scientist's Magazine—Useful Information—Ideas. Sample—29c. $1.00 Yearly. Experimenter's Magazine, Manitowoc, Wisconsin 54220.

300 PAGE Chemical Apparatus Catalog $2.00. Laboratory Materials, 1332 Hydepark, Chicago 60615.

FREE. Science Catalog. Chemicals, glassware, physics, biology. Frey Scientific, 465 S. Diamond, Mansfield 13, Ohio.

LEARNERS Special; includes: rocket kit, trajectory report, two engines $2.10. Catalog 25c Krueger Rocket Co., 6428 South Main St., Downers Grove, Ill. 60515.

ANTI-GRAVITY. Major scientific frontier. Potential fortune for inventor. Now available: notes from hundreds of latest technical reports by top gravity researchers. Contains gravity theories, matter and energy concepts, nuclear and universe structure theories, etc. Send $1. Refundable. C Champe, Box 303, Manhattan Beach, California.

CHEMICALS, laboratory apparatus, microscopes, mineralogy sets and telescopes. Catalog 35c. Sheard Science Supplies, Columbus, Wisconsin.

42 EMPLOYMENT INFORMATION

DIRECTORY Reports. Construction, Aviation, Shipping, Oilfields, Government Manufacturing, Trucking, etc. Foreign—Stateside. Helpful information plus job-getting tips on preparing application letters. Unconditional money-back guarantee. Only $3.00 ($3.25 Airmail). Research Services, Box 6768-PS, St. Louis, Missouri. 63144.

FOREIGN Employment: South America, Africa, Europe, Australia, USA. Earnings to $2,000.00 monthly. Construction, all trades, professions, occupations. Many companies pay fare, housing, benefits, bonuses. Write: Universal, Dept. A-3, Woodbridge, Connecticut 06525.

FOREIGN Employment. Construction, other work projects. Good paying overseas jobs with extras, travel expenses. Write only: Foreign Service Bureau, Dept. PS, Bradenton Beach, Florida.

JOBS available, Cape Kennedy, Orlando area. $1 brings current list, all categories. Plus housing information. New list weekly. Employment Information Box 251, Cape Canaveral, Fla. 32920.

TREMENDOUS Opportunities—U.S.A.—Overseas. Choose Jobs, Locations, Transportation. Free Details. Occupations, International Airport, Box 100-M13, Jamaica 30, N.Y.

43 AGENTS WANTED

YOUR Own business—Suits $1.50; Overcoats 65c; Mackinaws 35c; Shoes 12½c; Ladies' Coats 30c; Dresses 15c. Enormous profits. Catalog Free. Nathan Portnoy Associates, 2109-J Roosevelt Road, Chicago 8, Ill.

MAKE $280.00 getting just 10 growers to try Campbell's Plant Food. Sample free. Campbell, Rochelle 22, Illinois.

EVERY man a prospect. Refundable sales kit offer showing line belt buckles, tie clasps, money clips, cuff links, lapels, identification badges, individualized with customer's name and emblems. Cap badges for trucking, bus, taxi, police, firemen, also postal, letter carriers and heavy construction emblems. Choice 3000 emblems. Hook-Fast, Box 1088-PS, Providence, R. I.

START Your Own Business on Credit. Your own boss. Hundreds of Dealers making $100 to $300 and more weekly. We supply stocks, equipment on credit. 300 home necessities. Sales experience Unnecessary. Pleasant, profitable business backed by world-wide industry. Write Rawleigh, Dept. B-U-PSC, Freeport, Ill.

MAKE $50.00 daily selling air operated vacuum cleaners to service stations. Free details. Inka Industries, 2405 Crocker, Houston, Texas 77006.

WANT To Make Up To $100 a Week spare time, and get free shoes for life too? No investment. Rush card for free details. Mason Shoes, K-545, Chippewa Falls, Wisc. 54729.

START your own Party Plan Business. Free details. Varietycrafts, 6 Winston Lane, Terryville, N.Y. 11776.

GET New Shirt Outfit Free! $90 weekly on 5 average orders a day. Famous quality made-to-measure dress and sport shirts at $4.95 up, sell to all men. No experience needed. Full or part time. Write: Packard Shirt Co., Dept. 413, Terre Haute, Indiana 47808.

INSTANT Profits 40% advance commission taking orders for Sensational new Plastic Photo Enlargements. Personalized Fotorings, Compacts, Bracelets. Sales kit free. Novelko, 3343 North Avenue, Chicago 60647.

STRANGE "Dry" Window Cleaner. Replaces messy rags, liquids. Simply glide over glass. Samples sent on trial. Kristee, 146, Akron, Ohio.

Agents—300% profit selling genuine gold window letters: stores and offices. Free samples. Metallic Sign Letter Co., 1217-E West Newport, Chicago.

ESTABLISH Your Own Business. Low Prices On Used Clothing, Shoes, Household Goods. Unlimited Profits. Free Catalog. Northwestern Distributors, 2129 North Western Avenue, Chicago, Illinois 60647.

SENSATIONAL Profits selling Swiss Imports. Free details. Northwest, Medina, Washington 98039.

SEAMLESS Nylons $4.75 Dozen. Victor's, Box 3818-B, Cleveland 10, Ohio.

44 HIGH-GRADE SALESMEN

YOUR free copy of World's biggest sales magazine tells you how and where to make more money on your own in selling. Write Specialty Salesman Magazine, Desk 6B, 307 North Michigan, Chicago 1.

WILL You test new items in your home? Suprisingly big pay. Latest convenieces for home, car. Send no money. Just your name. Kristee, 165, Akron, Ohio.

Copyrighted material

$1,000.00 A month for making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. New chemical used by Airforce snuffs out fires instantly. Only $4.95. Terrific commissions. Millions want it. Free Kit. Merlite, 114 E. 62nd, Dept. P66-U, New York 16.

SENSATIONAL new longer-burning Light Bulb. Amazing Free Replacement Guarantee—never again buy light bulbs. No competition Multi-million dollar market yours alone. Make small fortune even spare time. Incredibly quick sales. Free sales kit. Merlite (Bulb Div.), 114 E. 32nd, Dept. C-73-U. New York 16.

SELL Advertising book matches. Write us today; we put you in business by return mail, handling complete line ad book matches in demand by every business right in your town! No investment; everything furnished free! Top commissions daily! Superior Match, Dept. P-266 7530 S. Greenwood, Chicago, Ill. 60619.

ASTONISHING Automatic Toilet Bowl Cleaner, deodorizer. Works when toilet is flushed. Housewives buy on sight for every bathroom, at only $1.98 each. Make up to $10.00 in hour, spare time. Free Sales Kit. Merlite, 114 East 32nd, Dept. G-71U, New York 16.

FREE. 206 Easy ways to make money taking orders for exciting new products—spare time. Send name, age for 5 months free subscription—Opportunity Magazine 850 N. Dearborn, Dept. 18-AS, Chicago.

EARN Big Commissions Full or Part Time. Show America's largest line Low-Priced Business Printing and Advertising Specialties Plus big catalog Union Label Political Advertising items. Calendars in season. Big Free Sales Kit samples hundreds items used daily by businessmen and political candidates. Merchandise bonuses for you. Free gifts for customers. Build profitable repeat business. Start now. National Press, Dept. 148, North Chicago, Ill.

NEW Car Thief Signal. Lightning Seller. Samples for trial. Northwest Electric, Ave. 127, Mitchell, S. Dak.

WANTED man to contact service stations. Needed invention. Huge profits. Cyclo Mfg., 3816 Dahlia, Dept. 102, Denver, Colo.

CALENDARS, Novelties—Full or Part Time. Liberal Commissions. Fleming, 6535-B, Cottage Grove, Chicago 37.

UP To $200 or more weekly. List accounts for collection. No collecting, selling or investment. Everything furnished. No experience needed. Full or parttime. United Financial Service, Merchandise Bldg., Dept. 244, Minneapolis, Minn. 55403.

45 EDUCATIONAL & INSTRUCTION

MASTER Watchmaking at home. Free sample lesson. Chicago School, Dept. WB, Fox River Grove, Illinois 60021.

PIANO Tuning Pays. Big money in spare time. Learn at home. No musical knowledge necessary. Phonograph, records, tools and instructions furnished. Electronic tuning also taught. Free catalog. Capital Tuning School, 3160 S.W. 16th Court, Ft. Lauderdale, Fla.

LEARN to Drive Tractor Trailer, Trucks, Buses. Short Concentrated Courses Available. Write for Free Brochure Driver Training Institute, 794 Bedford Avenue, Brooklyn, N. Y. JA2-5080.

BOOKKEEPERS — Operate Your Own "Dollar-A-Week" System. Ellis, Box 203, Cedar Grove, North Carolina.

FCC LICENSE in 6 weeks, First Class Radio telephone. Results Guaranteed. Elkins Radio School, 2603A Inwood, Dallas, Texas.

WOODWORKING and Cabinetmaking course for beginning and advanced home craftsmen. Only complete low-cost home training program available. Write for free booklet. Interstate Training Service, Dept. G-2, Portland 12, Oregon.

PIANO Tuning quickly learned with home study course. Diploma granted. American Tuning School, Gilroy, California.

USED Correspondence Courses and Books sold and rented. Money back guarantee Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

LEARN WHILE YOU SLEEP!

Fascinating, educational! Use your recorder, phonograph. Details, gigantic tape, record, equipment catalog FREE!

S.L.R.A. Box 24-B
Olympia
Washington

GRAPHOANALYSIS — Learn scientific handwriting analysis for profit, pleasure. Free sample lesson, catalog reveals plan. Write IGAS, Inc. 325 Jackson, Dept. 2AV 1, Chicago 60606.

MISSOURI Auction School. Free catalog! 1330-05 Linwood, Kansas City, Mo. 64109.

"FINGERPRINTING By Correspondence." Civil Service Opportunities. Good Pay. Fingerprint School. 2759G-West Broadway, Los Angeles 41, Calif.

DEVELOP Mind Power, personality, memory while asleep! Free details. SLRA, Box 24-SF, Olympia, Washington.

HIGH School Diploma at home. Qualified instructors. Approved materials. Southern States Academy, Professional Bldg., Dept. 12, Decatur, Ga.

BE A Real Estate Broker. Insure security for yourself and your family. Study at home. Prepare for state examination. Write for Free Book today. Weaver School of Real Estate, 3519-R Broadway, Kansas City, Mo. 64111.

ENGINEERING and Art Degrees earned through home study. Electronics, Mechanical, Liberal Arts. When writing, specify course desired. Pacific International College of Arts & Sciences, primarily a correspondence school. Resident classes also available. 5507-A Santa Monica Blvd., Hollywood, California 90038.

COMPLETE Your High School at home in spare time with 69-year-old school. Texts furnished. Diploma. Information booklet free. American School, Dept. X246, Drexel at 58th, Chicago, Illinois 60637.

INTERIOR Decoration: Approved supervised home study training. Fine starting point for career. No classes. Text and work kit furnished. Diploma awarded. Low tuition and payments. Send for free book. Chicago School of Interior Decoration, 835 Diversey Pkwy., Dept. 1722, Chicago, Ill. 60614.

LEARN Auctioneering. Free Catalog. Reisch Auction College, Mason City 3, Iowa.

BOOKS. Free general catalog. 60 pages. Text, vocational, educational, instructional subjects. Millions of volumes, new and used. Bargain prices. Books bought. Est. 1902. Long's College Book Co., Dept. M1, Columbus 1, Ohio.

YACHT Captain School trains you for professional command. 10 weeks-practical-classroom-cruises. Write: Holiday Harbor, 7742 S. Trail, Sarasota, Florida.

E-Z-HOOK Test Connectors speed your experimental hookups and make them easier. Guaranteed to save you time and money. Order E-Z-Hooks from your favorite Parts Distributor or write for Literature and Prices. E-Z-HOOK Test Products, Covington, Ky. 41012.

BOOKKEEPING, Accountancy, Taxes. Study at home. Write for details. Allen Badler C.P.A., 2063 East 18th, Brooklyn, N.Y. 11229.

NEED College Education? Credits toward degree thru home study courses given by accredited colleges. Information $1.00. Rea's, 3900 Louis, St. Louis, Missouri 63116.

NEW Home Radio Course only $26.95 complete. Tubes, components, tools, books included. Free literature. Edu-Kits, Department 635A, Hewlett, New York 11157.

RADIOBROADCASTING! Deejay, Newscasting! Home study. Fischer, 678 Medford, Patchogue, New York 11772.

WRITE For $$$$$—Free Confidential Directory of magazines that pay $$$$$ for jokes, recipes, etc. Writing ability unnecessary. Cash in spare time or become full-time writer of stories, articles, television scripts, etc. Palmer Institute-P, University Plaza, Newport, California 92660.

NEW-Mfg. Drafting Course-men-women-beginners. Send $12.50 for ⅓ total course. Drafting, Box 1728, Tulsa, Okla.

ADVERTISING Needs 18,000 new people each year. Prepare at home for profitable prestige career—or start your own advertising agency. No writing or art ability necessary. Free: Advertising Career Kit! North American School of Advertising—P, University Plaza, Newport, California 92660.

GAME Warden, Government Hunter, Forestry, Park and Wildlife Services announce job openings regularly. Prepare at home for outdoor work, good pay, security. Complete information Free! Write North American School of Conservation-P, Newport, California 92660

LEARN landscaping and the growing of plants. Start a profitable business part or full time. Free information without obligation. Lifetime Career Schools, Dept. PSE-26, 11826 San Vicente Blvd., Los Angeles, Calif. 90049.

BECOME Tax consultant. Our students earn $1,000—$3,000 every tax season preparing returns evenings. Accredited. State approved. National Tax Training School, Monsey K-1, New York.

LEARN Expert Cake Decorating, Candy Making. Free details on home instruction method. Candy & Cake, Box 54-AFN, Redondo Beach, Calif.

HOLLYWOOD Correspondence School of Bartending. Information Free. 5909 Melrose Ave., Suite 10B, Hollywood, California 90038.

LEARN Civil and criminal investigation at home. Earn steady, good pay. State age. Institute Applied Science, 1920 Sunnyside, Dept. 332, Chicago 40, Illinois.

USED Courses! Books! List 10c. Smith's 124 Marlborough, Salem, Mass.

FREE Bible Course. Degree. College, 143 South Gregg Street, Charlotte 8, N.C.

LEARN Real Estate—make your own deeds, contracts, etc. Textbook $15.00. Barnes, Star Rte B, Box 130, Palmer, Alaska.

LEARN to Service Oil Burners. Free information. Marlin Institute, Box 66095, Portland, Oregon 97266.

BOOKS. Send two 5c Stamps for descriptive circular. Frank Deisz, 8820 N. Lombard, Portland, Oregon 97203.

ELECTRONICS—F.C.C. License and A.S.E.E. Degree Programs. Correspondence and resident classes. Free Catalog. Write Dept. 5, Grantham Schools, 1505 N. Western Ave., Hollywood, Calif. 90027.

USED Courses, Books. Catalog 10c. Bayles, 78D Courtright, Wilkes-Barre, Pa. 18702.

ENGINEERING Home Study Simplified. Details. Erkatech, 7027 Smith, North Bergen, New Jersey 07047.

SLEEP learning! Sensational record introduces revolutionary discovery! Instant self-power control others. Free Trial Offer! Forum, 333-VX2 Michigan, Chicago 60601

PENMANSHIP full course $7.50. Details. C. W. Yorgey, Breinigsville, Pa.

FREE sleep-learning catalog. Fletcher, 2407 Catherine, Callas, Texas 75211-PS.

LOOK Ahead, Men, Women. Make a better future for yourself. Study business courses at home. Earn promotions, higher pay. Free literature. Aladdin Home Study Courses, Dept. B, 409 St. Louis Street, Springfield, Missouri 65806.

INCOME Tax Instruction—Individual; Small Business. $7.06. United Tax Publications, Box 1225, Akron, Ohio.

WRITE FOR $$$$$—Free Confidential Directory of magazines that pay $$$$$ for jokes, recipes, etc. Writing ability unnecessary. Cash in spare time or become full-time writer of stories, articles, television scripts, etc. Palmer Institute-P, University Plaza, Newport, California 92660.

46 CONTESTS

SWEEPSTAKES Contests. How To Win. Write for free information. General Contests, 1609-18 East 5th, Duluth, Minn. 55812.

WIN Cold Cash! Prizewinner sizzles with terrific contests, torrid tips, impertinence! Free sample! Box 11569, St. Petersburg, Fla.

Copyrighted material

47 DETECTIVES

DETECTIVE Training. Robert B. Phillips, Sr., Founder, Former Govt. Special Agent. For free information write to: 1917C North Kenneth Ave., Chicago, Ill.

DETECTIVE Profession. Home Study, Lapel Pin, Certificate, Future 2759CB West Broadway, Los Angeles 41, California.

DETECTIVE Course. Credentials, Diploma. Free Information, Southwestern Institute Criminology. Box 202, Geronimo, Oklahoma.

DETECTIVES — Excellent opportunities —Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 10024.

DETECTIVE Course. Free Information. Universal Detectives. Box 8180E, Universal City, California 91608.

50 BUSINESS SERVICE, INFORMATION, NAME LISTS

FINANCIAL reports—any business—certified. $3.00. Box 2-M, 275 Prospect. E. Orange, N.J.

51 SPECIAL SERVICES

PUBLIC Domain Lease Drawing Service. Western Oil Scout, P.O. Box 6822. San Antonio. Texas 78209.

IDEA Matching, filing, information 10c. Confidential Idea Center, Box 291, Waukegan, Illinois 60086.

52 AUTHORS SERVICE

WANT Your Book Published? Learn how we publish, advertise, promote, distribute. Many successes. Free booklet PS, Vantage, 120 West 31, New York.

PUBLISH Your Book! Join our successful authors: All subjects invited. Send for free appraisal and detailed booklet. Carlton Press, (Dept. PSB), 84 Fifth Avenue, New York 10011.

53 ADVERTISING, AGENCIES, ETC., FOR ADVERTISERS

FREE expert assistance for mailorder advertisers. Ratebook leading newspapers, magazines 10c. Chicago Advertising Agency, 28 E. Jackson, Chicago 4.

54 ART INSTRUCTION, CARTOONING, SIGN PAINTING

LEARN Sign Painting. Fascinating System. Straley, 410-P South Western, Springfield, Ohio.

18 CARTOON Lessons $2.00. 24 Advertising Lessons $5.00. Rm. 109, #6 Office Park, Birmingham 23, Ala.

"HOW to Make Money With Simple Cartoons." Everyone who likes to draw should have this book; Free! Send name, zip code. Cartoonists' Exchange, 192 Pleasant Hill, Ohio 45359.

LIKE to draw? Splendid opportunities in professional cartooning. Write for Free Catalogue. No obligation. National School of Cartooning, Box 8959-E, Cleveland 36, Ohio.

"KEY To A Cartoon Career". Send 50c handling to: Cartooning, Dept. C, Box 3176, Colorado Springs, Colorado 80907.

LEARN Profitable Magazine Cartooning! Free Details. Cartoonists, Box 3097, Lincoln 10, Nebr.

SIGN Painting Instructions, brushes, equipment. Latest methods. Free catalogue. Kaufmann Signs, Centertown, Missouri.

56 RUBBER STAMPS & OFFICE SUPPLIES

DEEP Face Hard Type for better rubber stamps. Buy direct from manufacturer—20% discount for a limited time only. Send for brochure. Barco Type Manufacturing, 237 South Evergreen, Bensenville, Illinois.

TYPEWRITERS, Adding Machines, Desks, Filing Cabinets. From $29.50. Buy at distributor's Prices. Free Catalog. Elgin, Dept. S-62, 1520 Vine St., Cincinnati, Ohio.

POCKET 3 Lines $1.00. Office stamps $1.50. Free catalog. Specialty, 8464 Manhattan, Detroit, Michigan 48211.

$2,500.00 IN PRIZES . . . to encourage literary talent. Write for details! We help place and sell short stories, articles, books, plays, poetry. Write today!

Daniel S. Mead, Literary Agency
915 Broadway, Dept. 125, New York, N.Y. 10010.

DEEP FACE Hard Type
FOR BETTER
RUBBER STAMPS
10 & 12pt. 20th CENTURY 605D
.030 ORD. TYPE | .050 DEEP FACE
Buy Direct
20% OFF
LIMITED TIME
COMPLETE SUPPLIES - FREE BROCHURE
BARCO TYPE Mfg.
237 S. EVERGREEN BENSENVILLE, ILLINOIS 60106

RUBBER Stamp Presses, Mounts, Supplies. Martins, 1425S Major, Jefferson City, Missouri 65101.

57 PRINTING, MULTIGRAPHING, ETC.

BEAUTIFUL Business Cards, letterheads, envelopes, fliers, etc. Low prices. Free samples and pricelist. Pioneer, PS-2, Island Park, N. Y. 11558.

1,000 GUMMED Address Labels $1.00. Walt's, Box 966, South Bend, Indiana. 46624.

BARGAIN! 100 Printed $5\frac{1}{2}$x$8\frac{1}{2}$ Letterheads and 100 #$6\frac{3}{4}$ Envelopes $2.75. Satisfaction Guaranteed. Glass, Wampum, Pennsylvania.

QUALITY Printing; lowest prices, samples. Dowling Press, Dept. PS16, Pittstown, N.J.

CIRCULARS, Booklets, Letters, Stationery. Estimates! Since 1931. Lonelm, Paulding, Ohio.

EMBOSSED Business Cards, 1,000—$3.95 Postpaid. Samples. John Peper, 1016 Fairmount Ave., Chattanooga, Tenn. 37405.

AMAZING Business Printing values. Samples. Print Shop, Box 576P, Greenville, R.I.

1000 ADDRESS labels $1.00, 1000 Business cards $3.95. Printing, Rubber Stamps. Jordan's 552 West O'Connor, Lima, Ohio.

DISTINCTIVE. Inexpensive. Embossed Letterheads. Postpaid. Universal, 226-SF Myrtle, Scotch Plains N.J. 07076.

BUSINESS Envelopes, letterheads, cards. Free brochure. Prestige Press, Box 146-P, Newton, Iowa 50208.

OFFSET Printing. Prompt service. Mimeo Press, 835 Falls, Rocky Mount, N. C. 27801.

PRINTING $8\frac{1}{2}$ x 11 white. 1,000 $8.50. Rubber stamp 4 Lines $1.00. "Quick Reply" ad-answering cards 4 Line Return Printed 100 $2.00. C and R, Box 1016, Evanston, Illinois.

THOUSANDS Embossed Business Cards $3.30. Dealers Wanted! American, Box 166H, NYC 10459.

BUSINESS Cards. Handcrafted Printing. Small quantities. Marshall, Payne Road, 3A Bethel, Conn. 06801.

100 PRINTED $5\frac{1}{2}$ x $8\frac{1}{2}$ letterheads and 100 #$6\frac{3}{4}$ envelopes $2.75. Pricelist free. Purple Enterprises, Box 16291-AO, Jacksonville, Florida 32216.

58 PRINTING OUTFITS, SUPPLIES

RUBBER Stamp Presses, Hydraulic Operated. Electrically heated. Sizes 5"x8", 8"x12", 10"x15", starting outfits, supplies. Printing Presses. Type Cases and Cabinets. Custom Manufacturing, 1464 East Commercial, Springfield 2, Missouri.

PRINTING Outfits, type, supplies. Send dime for illustrated supply book and samples. Kelsey, Inc., H-8, Meriden, Conn.

PRINTING Presses, Type, Supplies. Lists 5c. Turnbaugh Service, Mechanicsburg, Pa.

90% Profit Rubber Stamps. Complete outfit $99.95. Duckmann, Avoca, Arkansas.

RUBBER Stamp Presses, Supplies. Kiewiet, 2025 Barney Road, Kalamazoo, Michigan.

MAKE your own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 2, Wisconsin.

60 FOR INVENTORS

Advertisers using this classification in & after July, 1965 issue—please contact M. Z. Scott, Popular Science, before ordering ad.

PATENT Searches, professional patent development of inventions by Licensed Professional Patent Engineer and U.S. Patent Office Former Examiner with staff of engineering specialists in all fields of inventions. Expert searches performed in the U.S. Patent Office. Your inventions and ideas engineered for maximum patent protection and greatest commercial value. Inventions developed by us negotiated for cash or royalties with our nationwide contacts. Send for free Protection "Invention Certificates" and further interesting, valuable Patent Information. George Spector, Licensed Professional Patent Engineer, U.S. Patent Office Former Examiner, Woolworth Building, New York.

TREMENDOUS—Savings! Prepare your patent application yourself—easily, with our New "Patent Kit!" Complete instructions, materials, sample application—send $8.95 for immediate Delivery. Money-Back Guarantee! Congress Invention Company, 210A McKim Building, Washington, 5, D. C.

PATENT Searches, including copies of related U.S. Patents, $6.00. Inventors, attorneys, manufacturers use my "Worldwide" Airmail service! "Invention Record" form and "Information Every Inventor Needs," sent free! Miss Hayward, 1029F Vermont Av., Washington 5, D. C.

U. S. PATENT Office Searches, 234 Broadway, Room 3615, New York. Free Invention Certificates.

PROFESSIONAL Patent Searches, $6.00, including official U.S. Patent Office copies of related U.S. Patents! Prompt, dependable service. Certified, Airmailed! For free "Invention Record Folio" and "Important Patent Information Every Inventor Should Have," write: United States Inventors Service Company, 1311 "G" Street NW, Washington 5, D. C.

PATENT Searches including Maximum speed, full airmail report and closest patent copies, $6.00. Quality searches expertly administered. Complete secrecy guaranteed. Free Invention Protection forms and "Patent Information." Write Dept. 4, Washington Patent Office Search Bureau, 711-14th, N.W., Washington 5, D. C.

SAVE High fees! Prepare your patent application yourself! New "Do-It-Yourself" Patent Kit now makes it easy. Free "Registration Form." Miss Blaine, 306 Carry Building, Washington 5, D. C.

IMMEDIATE cash, for Patent Applications, free Patent Searches. Write for details. Universal Patents, 184-B, Marion, Ohio.

INVENTORS: Prepare your own patent application. Our "Patent Kit" includes detailed instructions and all necessary material. $14.75. Money back guarantee. National Inventors Company, 1244-19th Street, N.W., Washington, D.C.

YOUR Ideas may be worth a Million Dollars, but . . . . if they stay in your head they're not worth a nickel! Now through membership in the Idea Club of America, Inc. you can sell your ideas and get maximum cash rewards. Legally protected, your ideas are consistently exposed to interested parties. Send only a $1.00 today for big illustrated book "Millions For Your Ideas", showing how you can profit by membership in one of the nation's most dynamic organizations. Idea Club of America, Inc., Dept. PS, Newton Center, Massachusetts 01259.

"INVENTORS Complete Guide Book" tells you how to develop and perfect your idea; what to invent for profit. Free brochure. Castellazzo, 3257-PC Kansas, Oakland, Calif. 94602.

IF your invention is adaptable to promoting we will contract for selling on cash or royalty. Free booklet outlines royalty rates, requirements. Kessler Corporation, C-72-FI, Fremont, Ohio.

PATENT Searches—48 hour airmail service, $6.00, including nearest patent copies. More than 200 registered patent attorneys have used my service. For Free invention protection forms, write: Miss Ann Hastings, Patent Searcher, P.O. Box 176, Washington 4, D. C.

"ENGINEERING analysis service for inventors." Concepts, designs, mechanisms. Acknowledged and confidential handling. Dynamic Systems, 5051 Canterbury, Cypress, Calif.

61 INVENTIONS WANTED

Advertisers using this classification in & after July, 1965 issue—please contact M. Z. Scott, Popular Science, before ordering ad.

INVENTIONS wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 2420F 77th, Oakland 5, Calif.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 30C, 635-F Street, N.W., Washington 4, D. C.

INVENTIONS Promoted—For Cash-Royalty Sales with Manufacturer Contacts. George Spector, Licensed Invention Engineer, Woolworth Building, New York.

WE have markets for worthwhile inventions. Harvey Engineering, Cambridge, Maryland 21613.

INVENTORS! Outright cash sale or royalties for your inventions. Patented. Unpatented. Active demand from our client manufacturers. Financial assistance available. Write Dept. 50, United States Invention Brokerage, 78 Wall Street, New York 5, N. Y.

INVENTORS! We will develop, sell your idea or invention, patented or unpatented. Our national manufacturer-clients are urgently seeking new items for highest outright cash sale or royalties. Financial assistance available. 10 years proven performance. For Free information write Dept. 54, Wall Street Invention Brokerage, 79 Wall Street, New York 5, N. Y.

INVENTORS! Don't sell your invention, patented or unpatented, until you receive our offer. Eagle Development Company, Dept. S, 79 Wall Street, New York 5, N. Y.

INVENTORS! Sell your invention for cash or royalties! Our client manufacturers eagerly seek new items. Patented. Unpatented. Financial assistance if needed. 25 Years proven performance. For free information, write Dept. 17, Gilbert Adams, Invention Broker, 80 Wall St., New York 5, N. Y.

INVENTORS: Protect your ideas! Free "Recommended Procedure". Washington Inventors Service, 422-G, Washington Building, District of Columbia, 5.

INVENTORS! Don't sell or license your invention for cash or royalties until you receive our offer. Financial assistance available. For Free information, write: Dept. 72, International Invention Institute, 17 Park Row, New York 38, N. Y.

WE either sell your invention or pay cash bonus. Write for details. Universal Inventions, 298-G, Marion, Ohio.

62 PATENTS FOR SALE

I have two patents for sale. Pat. No. 3,109,242 Work Locating Means for Machine Tool Work Holders Pat No. 2,994,437 Folding Pocket, Hat or Handbag Holder. Ernest Nyitrai, 127 Lockwood Ave., Stamford, Conn.

64 MODELS, MODEL SUPPLIES

ROCKETS: New Illustrated Catalog 25c. Single And Multistage Kits, Cones, Engines, Launchers, Trackers, Technical Information, Etc. Fast Service. Estes Industries, Penrose 3, Colorado.

SHIP and Yacht model fittings; Pine construction Hull Kits; blueprints. Send 50c for Illustrated catalog. A. J. Fisher, Inc., 1002 Etowah Avenue, Royal Oak, Michigan. 48067.

SHIP Models, Kits, fittings, plans, books, tools, engines, motors. Big illustrated catalog 50c. James Bliss & Co., Dept. PS, Route 128, Dedham, Massachusetts 02026.

DRAINS cellars, cisterns, wash tubs. Irrigates—Circulates—Sprays $8.95

Stainless shaft. Won't rust or clog. Use 1/6 HP motor or larger: ¾ HP for up to 2,400 GPH: 1,800 GPH from 25' well. 1" inlet; ¾" outlet. Free coupling $8.95

Heavy duty ball-bearing pump. Up to 5,200 GPH. 1¼" inlet; 1" outlet. $12.95

Postpaid if cash with order. Money Back Guarantee

LABAWCO PUMPS, Belle Meade 3, N.J.

SHIP Model Kits and fittings: clippers, frigates, etc. Catalog, paint-tool list, book list, 35c. Model Shipways, Box 85, Bogota, New Jersey.

BARGAIN prices ST Engine Castings. Ship Models Ltd., Andover, Mass.

64B ELECTRIC TRAINS

LIONEL Trains Bulletin 10c, Catalog 25c. Mack Bros., 2041 Chicago Ave., Chicago 60622.

KEEP Up With Progress-Control your electric train automatically. Our transistorized switch stops train at the station for 5-30 sec's. Simple connections, instructions included $16.95. Zalis Assoc., 177-5 Street, Jersey City, N.J. 07302.

65 HOME CRAFTSMAN

WOODWORKING Catalog and Manual 25c. Plus free "101 Project Ideas." World's most beautiful veneers, lumber, plywood! Wood finishing, upholstery supplies. Furniture hardware. 2,000 needed workshop products. Constantine, 2053-B Eastchester Road, Bronx 10461.

SKIL-CRAFTS New '65-'66 Catalog. Largest and Finest selection of Leathercraft. Artist, Hobbycraft supplies in the world. Free Gift with first order. Send 50c. Refundable with first order. Skil-Crafts, Box 105-PS, Joplin, Mo.

101 PATTERNS of smart Gifts, Novelties, Shelves, Action windmills plus "Make Money Jig Sawing." $1.00 Mastercraft, J5S, 7041 Olcott, Chicago 60631.

2512 PLANS. Patterns, things to make, do. Fun. Profit. World's greatest selection. Catalog, 10¢. Craftplans, 18250-B Harwood, Homewood, Ill.

WOODWORKERS, Hobbyists: Save! Quality supplies and tools. Free catalog. EPCO, 2222 Edgewood Avenue, Minneapolis, Minn. 55426.

SQUAREKNOTTERS: Make belts, handbags, lanyards, dog leashes, etc. Special offer! Beginner's book, catalog and quality cord samples 25c. P. C. Herwig Co., Dept. 71-P1, 264 Clinton St., Brooklyn, New York 11201.

PATTERNS of adorable nursery rhyme felt pictures for childs room. 50c Rahiser Crafts, 2180 Center Ave., Box 3-A, Fort Lee, N.J. 07024.

2,500 different plastic molds, figurines, crafts. Catalog 25c. Steece Bros., Box 177-PS, Sioux Falls, S.D. 57101.

WOODWORKERS Free money making Furniture patterns. Gmams, Box 19351, Los Angeles, Calif. 90019.

ASSORTED Jig and Fixture Plans. Send $1.00. Menz, Box 65, Lexington, Ky.

66 DO IT YOURSELF

PAINT Your own wall mural! Inexpensive, easy Paint-by-Numbers Pattern Kit includes oils, brushes—everything! 35 decorator designs. Color catalog 10¢. Muralart, 4401-P, Birch, Newport, California 92660.

CHAIN Link Fence. Posts, Fittings, Gates, Kennels. Discount Prices. Install-Earn to $5.00 hour. Detailed instructions—Catalog 50¢. Cordry Manufacturing, Dept. PS, 2400-06 Truman Rd., Kansas City 6, Missouri.

INSTALL spray humidifier in your forced air furnace. Humidistat installed in cold air return controls humidity of air. Complete kit includes humidistat, nozzle, saddle and solenoid valves, all connections, copper tubing and installation instructions. $29.50 postpaid. Humidifier Systems, Box 234, Dyer, Ind.

REPAIR your own Automatic Washer. Service Manuals for Whirlpool, G.E., Kelvinator, Frigidaire, Hotpoint, Hamilton, Westinghouse, Kenmore. $2.50 each. Royalwood Appliance Service, 1383 Royalwood Rd., Brecksville, Ohio 44141.

AUTOMATIC Washer Repair Manuals for: Frigidaire, General Electric, Hamilton, Hotpoint, Kelvinator, Kenmore, Norge, RCA Whirlpool, Speed Queen, Westinghouse—$2.25 each Ppd. Major Appliance, 13106 Caine Avenue, Cleveland, Ohio.

SECONDS required to cut glass bottles in half. Make drinking glasses, interesting vases, etc. Complete instructions $1.00. Bailey, P.O. Box 809, Fort Walton Beach, Florida 32548.

67 OLD GOLD, JEWELRY, WATCHES, ETC.

USED and new watches $2 up. Free Catalogue, Southern Watches, 5-PS So. Wabash, Chicago 3.

CASH Immediately For Old Gold, Jewelry, Gold Teeth, Watches, Diamonds, Silverware, Spectacles, Platinum, Mercury. Free information. Rose Industries, 29-Y East Madison, Chicago 2.

HIGHEST Cash for Gold, Jewelry, Gold Teeth, Rings, Diamonds, Watches, Silver, Platinum. Mail Articles Today. Free gift with Information. Chicago Gold & Precious Metals, 6 E. Monroe, Dept. 2857, Chicago.

WANTED, gold, silver, platinum, scrap (any form), coins. Information free. Wilmot's, 1067K Bridge St., Grand Rapids, Michigan 49504.

CASH Immediately for old gold, watches, diamonds and jewelry. Write Barney, Joseph Bros., 5 South Wabash, Chicago 60603.

70 OF INTEREST TO WOMEN

"PROPHET Elijah Coming Before Christ" Wonderful Book Free. 58 Megiddo Mission, Rochester 19, New York.

$400.00 MONTHLY Possible . . . Home Typing! Full or Part-time. Instruction Manual, $1.00. Pulse Box 18177-EB, Indianapolis, Indiana 46218.

DRIVE new car, wear new clothes, buy color TV. Get Daily cash income. Put spare hours to work. Write for 5 months subscription Opportunity Magazine; see hundreds easy ways to make money. Opportunity, Dept. 19-AO, 850 N. Dearborn, Chicago.

$100 WEEKLY Possible Typing at Home. Details $1 (Refundable). Bonco, 130 Cumberland, Masontown 5, Pa.

MAKE Money Writing Short Paragraphs. Information Free. Barrett, Dept. C-86-A3, 6216 N. Clark Street, Chicago 26.

71 FOR SALE MISCELLANEOUS

GADGETEERS—Free catalog on Surplus Electronics, Hydraulics, etc. Earl's Supply Company, P. O. Box 265, Lawndale, California 90260.

BUILDERS! Make rafter cutting easy! Free information. Emmert Products, Sycamore, Illinois 60178.

72 WANTED TO BUY

QUICKSILVER, platinum, silver, gold. Ores analyzed. Mercury Terminal, Norwood, Massachusetts.

73 WEARING APPAREL

TAILORED SUITS, Sweaters, Cameras. Mandarin International, 214 Shaws Building, Hong Kong.

77 TREASURE FINDERS & GEIGER COUNTERS

TRANSISTOR Treasure Detectors, underwater detectors. Many models. Free catalog. Gardiner Electronics Co., Dept. 1, 4729 N. 7th Avenue, Phoenix, Arizona.

POWERFUL Metrotech Locators Detect Gold, Silver, Coins, Relics. Moneyback Guarantee, Terms, Free Information. Underground Explorations, Dept. D, Box 793, Menlo Park, California.

NEW Coin Locator! Free literature! Howe, 811-A Kansas, Atchison, Kansas.

Copyrighted material

TREASURE. Find gold, silver, relics with super powerful Detectron locators. Free information. Detectron, Dept. PS-1, San Gabriel, California.

TREASURE, Gold, Silver, Relics. New 1966 detectors now available. Free information. Rayscope, Box 715, North Hollywood, California.

FIND Buried coins, treasures, gold, silver with sensitive new 1966 transistor metal detectors. Free information. Sensitronix, 2225-H Lou Ellen, Houston, Texas 77018.

FUN & Profit finding buried treasure, relics with Transistor M-Scope. Booklet, interesting customer comments Free. Terms. Fisher Research, Dept. GDX, Palo Alto, California.

SAVE! Build Transistorized Treasure Finder. Details Free. Del Research, Box 347A Alden Manor, Elmont, N. Y.

FIND Gold, silver only. Gold-Tec-Tor, Box 791, Seminole, Okla. 74868.

TREASURE-Fone Automatic. A new principle in electronic metal detection. Patent Pending. Write: Highlander Co., Dept. 22, 10308 Brenda Way, Rancho Cordova, Calif.

COIN-COMBER metal detector. Sensitive silicon transistor circuit. $39.95 assembled. Racom, Box 13469-A, Orlando, Fla.

GOLD, Treasure, Coin Locators $3.00 complete. Guaranteed. Locators, Ashland, Oregon.

78 WATCH REPAIRING

WATCH and clock repairing books. Free Catalog, North American, Box 77-BP, Fox River Grove, Illinois 60021.

WATCHMAKERS'-Jewelers' supplies, instructions. Catalog 50c. Bengal's. 10717 Venice, Los Angeles 34, California.

WATCHMAKERS' Tools, Materials, Supplies. Watches. Catalog. Gales, Box 1000. Chicago 90, Illinois.

79 MISCELLANEOUS

WINEMAKERS: Free illustrated catalog of yeasts, equipment. Semplex, Box 7208, Minneapolis, Minn. 55412.

FREE Wholesale Catalog! 10,000 Products . . . Tremendous Discounts! Taylor Distributors, Newton 3, New Jersey.

HAPPY Feet Tie Tack. Unique novelty. Outrageously funny. Gets a thousand laughs. Send only $1.00. Worth lots more. Free catalog. Federal, 6652PS North Western Avenue, Chicago, Illinois 60645.

OLD Wine Recipes $1.00. Ogden, Box 7218 Samoset, Florida 33508.

YEAR-Round Wine Drinking and Wine Making Guide. $1.00. Alfor, Box 627, Holland, Michigan.

BOOKS on Antiques and their prices! Free circular S. Warman Publisher, Uniontown, Penna.

ID. TAGS. We emboss Name, Address and Social Security number on stainless steel tag. Tag and key chain—Price $1.00. E.W. Farley, Box 6, Arcadia, Fla. 33821.

EYE Glasses Slip? Invisible corrective aids-$1.00. Fitrite, Box 22101, St. Louis, Mo. 63116.

LISTEN-IN Device! Unnoticed! Monitor telephone conversations, etc. $3.98 complete. (Guaranteed). Research Enterprises, 29-TL5 Samoset, Woburn, Mass.

MEN! Confidential Directory contains 70 dealers, unusual unique items — $1.00. Sharon, 300 Northwest 36th Street, Miami, Florida 33127.

BLITZ-Reducing! 5 pounds overnight! Guaranteed! Bijou, Box 1727-BV, Hollywood, California. 90028.

FREE! Vacation suggestions for 1966. Box 435-PS, Hillsboro, Ill. Send 10c for handling.

SUPERSENSITIVE Listening-In Device picks up any telephone conversation in vicinity. No connection to telephone necessary. Easily concealed. $2.98 Complete. Consolidated Acoustics, 1302J Washington, Hoboken, New Jersey.

Great Education is the Only Road to a Great Society

PANSOPHY

is a recently chartered (N.Y. State, Albany: Tax exemption by the IRS under BUF-EO-65-143) charitable, educational and scientific, non-profit organization.

Its principal tenet is; To activate knowledge and to motivate reverence for the material and spiritual welfare of the nation and of mankind.

It is a signpost along the road to a Great Society.

Make it your own road by your participation.

Send your contribution to:

Pansophy, Inc.

115-117 Redfield Pl.
Syracuse, N.Y. 13210

$2.98

AUTOMATIC RAPID FIRE REPEATER

FIRES 70 ROUNDS

Amazing new 1966 model automatic . . . Holds and fires 70 pellets automatically from over-size chamber at incredible firing speed. Peak accuracy firing power to distances of 40 feet and more. Smooth Jam-proof action guaranteed. No recoil. Non-lethal. Safe. No permit needed but not sold to minors under 16 years of age.

Use for target practice indoors and outdoors. Stop animal pests. Walnut-Color stock is contoured to fit the hand. **Send $2.98** cash, check or money order plus 27¢ shipping charge. We include free ammo. Satisfaction guaranteed or money back.

STANDARD AMERICAN

Dept. 2-PSZ, 1-Park Ave., N.Y. 10016

80 PERSONAL

LOANS by Airmail $100-$1000. Anywhere. Confidential. Write Union Finance, Dept. PS, 222 W. Osborn, Box 7457, Phoenix, Arizona.

CONSOLIDATE All Your Bills into one—small monthly payment! Borrow $100 to $1,000 by mail! Pay off all your debts—repay in convenient, monthly payments . . . take up to 36 months. $5.00 repays $104.65; $14.00 repays $293.02; $25.00 repays $532.26; $33.00 repays $819.57; $40.00 repays $1,009.-36. Everything comes to you in a plain envelope! "U.S. Mail" secrecy . . . no co-signers needed! Get the money you need fast . . . Write for information today! No obligation! Dial Finance Co., Dept. 2-215, 410 Kilpatrick Bldg., Omaha, Nebraska 68102.

INVESTIGATORS, free brochure, latest subminiature electronic surveillance equipment. Ace Electronics, 11500-F, NW 7th Ave., Miami, Florida 33168.

BORROW $1,233 Airmail! Repay $54 for twenty-nine months. State licensed. Postal Finance, Dept. 11-M, Kansas City, Kansas 66117.

RUPTURED. Relief and Comfort. No Understraps, Elastic or Steel. Write Hand Lock Products, Preston 2, Ontario, Canada.

TOO Many Debts? I show you how to get rid of every debt you now owe. 100% legal. Write: Kirk Products, Chamois, Missouri 65024.

EUROPEAN Tonic grows hair, controls falling. International Laboratories, Box 4176, Miami Beach, Florida 33141.

I.Q. TEST. Know your I.Q. Free Sample. Test Center. Box 139B, Fresh Meadows, New York 11365.

LAST Chance to mail a brick, women in construction. Lanyfrimpad, 5 Chatam St., Norwalk, Ohio.

YOUR Future revealed—$2.00. Satisfaction guaranteed or refund. Bernhard Kroeker, Steele City, Nebraska.

ENGAGED? Make your own pre-marriage contract. Helps protect future rights. Legal form: two for $2.00. Cash or check. Metzger, Dept. P1, Box 541, Camp Hill, Pa. 17011.

LEG Sore Sufferers—Send for Free Book on proven Viscose for relief of pain and aches of leg ulcers, swelling, itch, rash due to deep vein congestion. Works as you walk. Viscose Co., 100 West Chicago Avenue. Dept. PS, Chicago 10, Ill.

BIRTH Certificates, Marriage Certificates, Diplomas! 2 blank forms $1.00. Sample 10c. Standard Forms, Box 482-S, Washington, D. C. 20044.

PROPERTY Owners. Your mapping specialist, write today, Deed-Ettes, Mt. Pocono, Pa.

EARN interest, write checks—on the same account! Citizens Bank, Lockbox 71, Chicago 60648.

ALL occasion gifts, free brochure. Jay Dee Specialties, Box 105, East Longmeadow, Mass. 01028.

LOSING Hair? Balding? Dandruff? Free copyrighted booklet. Dr. Shiffer Laboratories, 533 Euclid Arcade, Cleveland, Ohio. 44115.

SUPER memory overnight! Success guaranteed! Bijou, Box 1727-V, Hollywood 28, Calif

N.Y.C. Manhattan address. Reasonable. Information 25c. S. Roberts, 1170 Sixth Avenue N.Y.

FREE Catalog of quality gifts for that special occasion. Modern Items Co., 332 N. 81st, Seattle, Wash. 98103.

INVESTIGATORS, free brochure on (Snooper) new wireless listen in device (unnoticed). Hear two way conversation through FM Radio. TV Sales Co., 3191 N. Watkins, Memphis, Tenn.

LOAN On Debts. Poor credit. Free details. Counselor Reports, Harlingen 16, Texas.

"PAY Yourself First" ends money worries. Complete method $1.00. Howe Co., 3053 Main, Buffalo, N.Y. 14214.

80A REMAILING SERVICE

BRITISH Bahamas remails; $50c Airmail; 25c surface. Baites, Box 1829, West Palm Beach, Florida.

SECRET, Receive, Remail, 25c. $2.75 Monthly. Skymail, Box 874-A, Sunnyvale 88, California.

REMAILS, El Paso, Texas—25c; Juarez, Mexico—50c, Box 9242, El Paso, Texas 79983.

SOUTH America Registered re-airmails $1.00. Confidential, reliable. Leon, Box 360, Guayaquil, Ecuador.

BALDING? Try my method. $3.00. Albert Echols, 3438 6th Ave., Los Angeles, California 90018.

SOUTH America Registered re-airmails $1.00. Confidential, reliable. Leon, Box 360, Guayaquil, Ecuador.

N.Y.C. REMAILS 25c, $3.00 monthly. Dowling, P.O. Box 64, Staten Island, N.Y. 10307.

PRESIDENTIAL remails. 25c, $3.00 Monthly. Mr. Taylor, Box 25, Newtonville, Mass.

FLORIDA remails 25c. Monthly $3.00. Zemba, Box 174, Miami 45, Florida.

BOLIVIA Re-Mailing 50c. Confidential. Information. Jack Down, Casilla 642, Santa Cruz, Bolivia.

CONFIDENTIAL—Los Angeles Mailing Address $3.00 monthly. Remails 25c. Details Free. Nationwide Research, 802 W. Vernon, Los Angeles 37, Calif.

80B LOANS BY MAIL

LOANS by Airmail $100-$1000. Anywhere. Confidential. Write Union Finance, Dept. PS, 222 W. Osborn, Box 7457, Phoenix, Arizona.

LOW-COST Loans by Mail. $6.00 monthly repays $104.50; $56. monthly repays $1,321.39. Borrow any amount. Guaranteed fast, confidential. Write today! Bankers Investment 53-C, Box 1648, Hutchinson, Kansas 67501.

NEED Money? Borrow $100—$1000 by mail. Confidential, repay in 36 months. Free loan application. Budget Finance Co., Dept. AB-106, 317 So. 20th, Omaha 2, Nebraska.

Copyrighted material

DANA ANDREWS, Star of Stage, Screen and TV. . . Reports on AMERICA'S MOST REMARKABLE BUY IN PROFESSIONAL QUALITY POWER TOOLS...

DANA ANDREWS . . . Star of "CRACK IN THE WORLD" in Technicolor—a Paramount Release—writes . . . "Like most people, I guess, I sure had my doubts about how anyone could sell machines that are supposed to do so much . . . for so very little. I was never more pleasantly surprised! Every claim for them—and more—is true. Putting them through the most rugged workouts, has convinced me that the AMCO people know something no other manufacturer in America has been able to find out. These machines are, without question, a most remarkable buy in professional quality power tools."

BUY DIRECT FROM OUR FACTORY Amco POWER TOOLS SAVE AS MUCH AS 80%

8" TILT ARBOR POWER SAW

$14.95

f.o.b. factory. Wt. 25 lbs.

Includes completely assembled cast iron and steel 8" tilt arbor power saw with ground cast iron table . . . less blade. If desired, RIP FENCE for easier work alignment, $3.50 additional

REVOLUTIONARY PATENTS DECREASE COSTS, INCREASE EFFICIENCY
Full scale power tools of heavy duty 100% cast iron and steel. Streamlined design reduces weight, cuts material and production costs. Special patents provide added efficiency, accuracy, savings. Parts made, assembled, tested and packed right in our own factories, shipped direct . . . save store profits.

DOES WORK OF $75 BENCH SAW
as is. Converts easily to equal any $300 floor model cabinet units! Crosscuts, rips, mitres, cuts compound angles, dadoes, makes coves and mouldings.
FREE CABINET BASE PLANS
Use as portable bench saw as received (inset photo) . . . or transform easily and inexpensively into floor model (as shown) guar. to do work of floor models costing $300. FREE plans . . . sheet of ¾" plywood and 3-4 hours are all you'll need. Use your AMCO saw for cutting. Plans provide 27" x 24" work surface, 33" height, pullout sawdust bin, tool storage compartment.
10-YEAR FULL SERVICE GUARANTEE *

BLADE TILTS . . . TABLE STAYS LEVEL
• Locks securely at any angle to 50°, raises, lowers 0"-2¼" • Patented tilt mechanism, accurate etched scale • Patented motor mount takes std. ¼ h.p. or larger motor, keeps belt tight, assures perfect alignment at any angle, transmits full power • Takes std. blade, saw insert removes to take dadoe heads, cutters, etc. (not incl.) • Accurate mitre gauge assembly • Ground spindle • Enclosed steel base • "Compo" bearings • Accessories available at factory prices • RIP FENCE, if desired for easier work alignment: Std. size (for bench saw) $3.50; larger fence (for cabinet base, as ill'd.) $4.50.

6" SWING 3-FT. LATHE

$9.85 f.o.b. factory

Optional Faceplate for turning bowls, trays, lamp bases, rosettes, etc. $2.50

Complete as shown

DOES THE WORK OF $40 UNITS—
Sturdy all cast iron power tool turns wood or plastics with the precision and speed of machines selling for 4 times as much. Tubular steel bed, ball thrust cup center, spur center. T-Rest assembly, lever action tail stock. 2 speed pulley. Fits any motor.
10-YEAR FULL SERVICE GUARANTEE *

FULL 22" LONG, 4⅛" JOINTER-PLANER

$19.95 F.O.B. Factory Complete as shown

100% precision ground cast iron and steel.

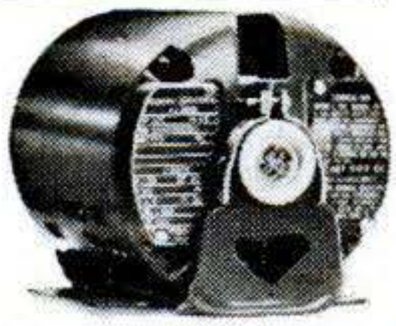
DOES WORK OF $60 UNITS
Now, at little more than a hand tool price, a guaranteed professional quality precision machine which does same work as skilled hand planing . . . much faster, more accurately. Make accurate glue joints; rabetting cuts for doors, window frames, table drawers; square taper cuts for chair legs; accurate beveling.

• Precision ground cast iron tables, adjustable for depth of cut • Rigid cast iron base • New patent-pending design holds clearance between knives and tables at any depth • Rabett depth ⅜" • Hardened, ground high speed steel knives • Patent-pending fence adjustable to any position, any angle 0°-50° • Patent pending lift-off guard (nothing to loosen!) • Balanced steel cutter head.
10-YEAR FULL SERVICE GUARANTEE *

UNCONDITIONAL 10-DAY MONEY BACK GUARANTEE
You must be fully satisfied. If not, return in 10 days, freight collect. Money refunded in full, no questions asked.

OR 1/2 HP ELECTRIC MOTOR

SPECIAL AMCO PRICE (when purchased with any unit in this ad)
$12.95 f.o.b. factory
if purchased separately, $18.95

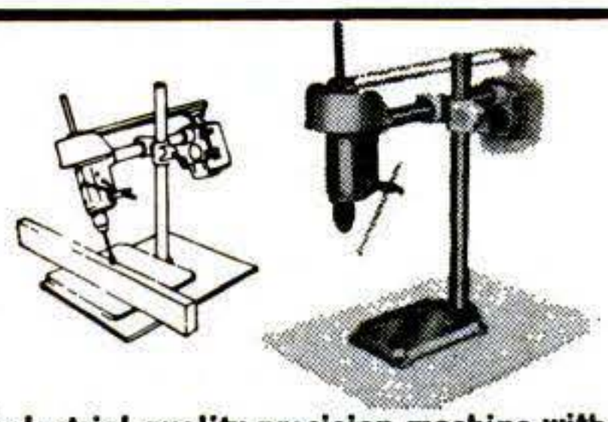


SPECIAL LIMITED TIME ONLY
Brand new factory-fresh motors for use with any of the units on this page. Limited quantity purchase . . . first come, first served. Wt.: 17 lbs.
FULL SERVICE 1-YEAR WARRANTY
Otherwise, as described below *

32" RADIAL DRILL PRESS

$29.95 F.O.B. Factory
½" Cap. Jacob's Chuck Inc.
Shipping Wt. 30 lbs.

DOES WORK OF $90 UNITS . . . AND A GREAT DEAL MORE



Industrial quality precision machine with all features of standard drill press, many extras. Head raises, lowers. Greatly increased depth of throat. Can be pre-set to any angle or position for on-or-off table drilling . . . even horizontal drilling. All cast iron and steel.
10-YEAR FULL SERVICE GUARANTEE *

***10-YEAR FULL SERVICE GUARANTEE** Any part or parts of any AMCO power tool which may become inoperative for any reason within ten years after the purchase date will be repaired or replaced by the factory without cost to the purchaser. Your only cost: for postage.

MAIL COUPON TODAY!

AMERICAN MACHINE & TOOL CO., Dept. PS-26, Royersford, Pa.

Please send me the units checked. Payment in full enclosed $..... or $3 deposit each item enclosed, balance C.O.D. ☐ I MUST BE FULLY SATISFIED OR WILL RETURN UNIT WITHIN 10 DAYS FOR FULL REFUND. No questions asked.

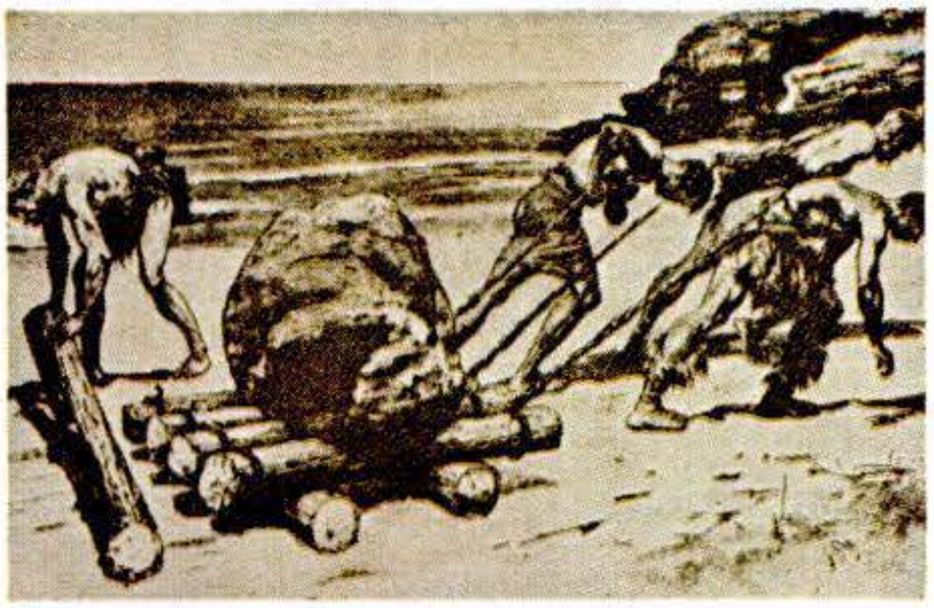
☐ 8" Power Saw at $14.95 ☐ Jointer-Planer at $19.95
☐ Standard Rip Fence #354 at $3.50 ☐ Lathe at $9.85
☐ Long Rip Fence #354C at $4.50 ☐ Drill Press at $29.95
1/2 hp GE Motor: ☐ $12.95 (purchased with other item)
☐ $18.95 (if purchased separately)

NAME .....
ADDRESS .....
CITY .....ZONE/ZIP .....STATE .....

Copyrighted material

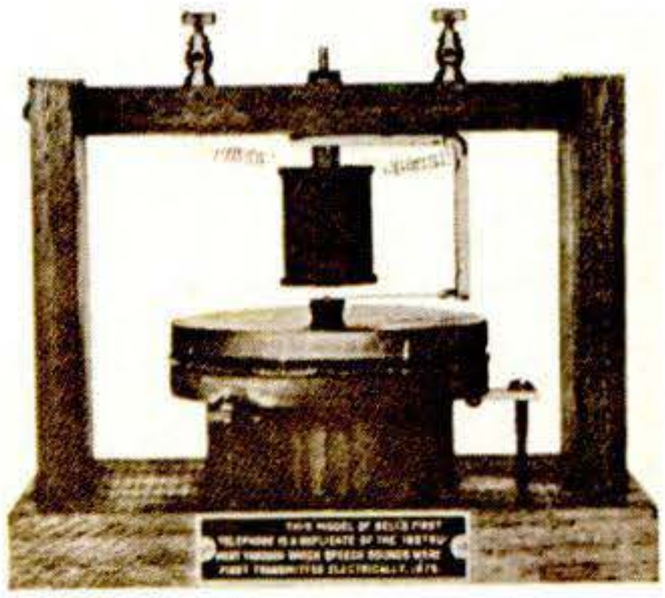
©VOLKSWAGEN OF AMERICA, INC.

They laughed.

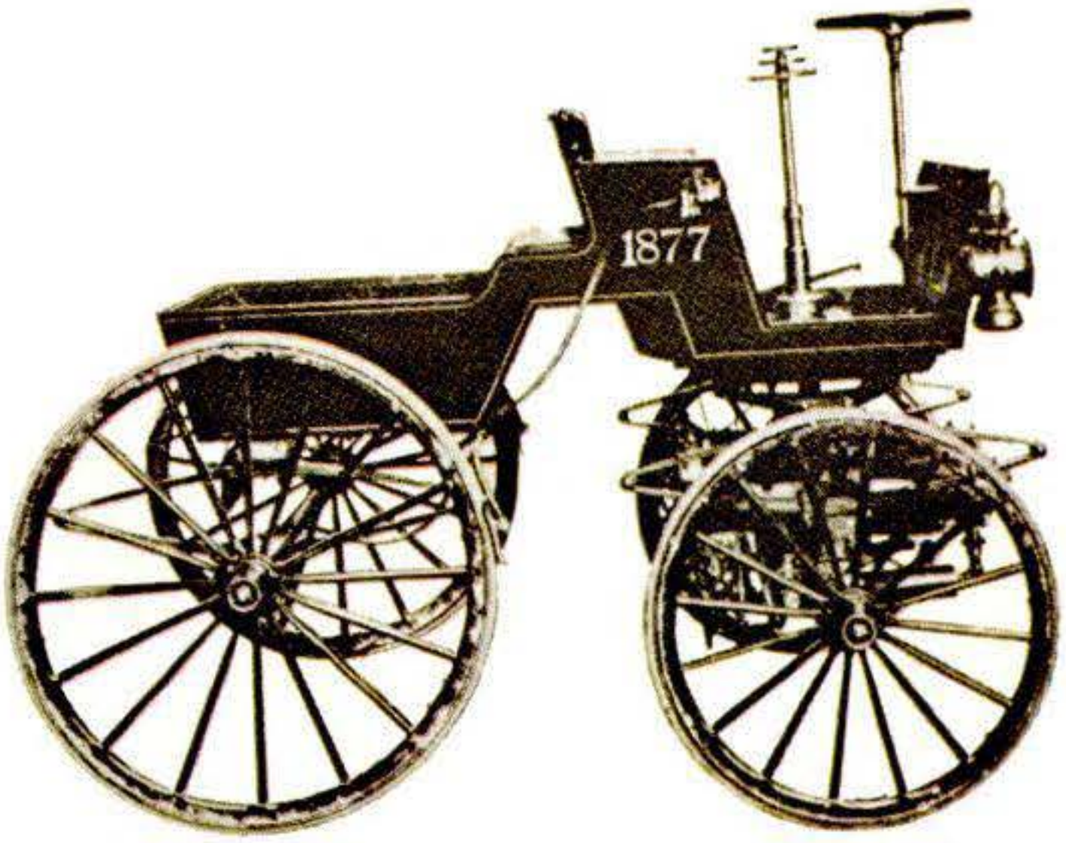


3000 B.C. Somebody invented the wheel. It was round and funny. And since the road wasn't invented yet, everybody laughed.

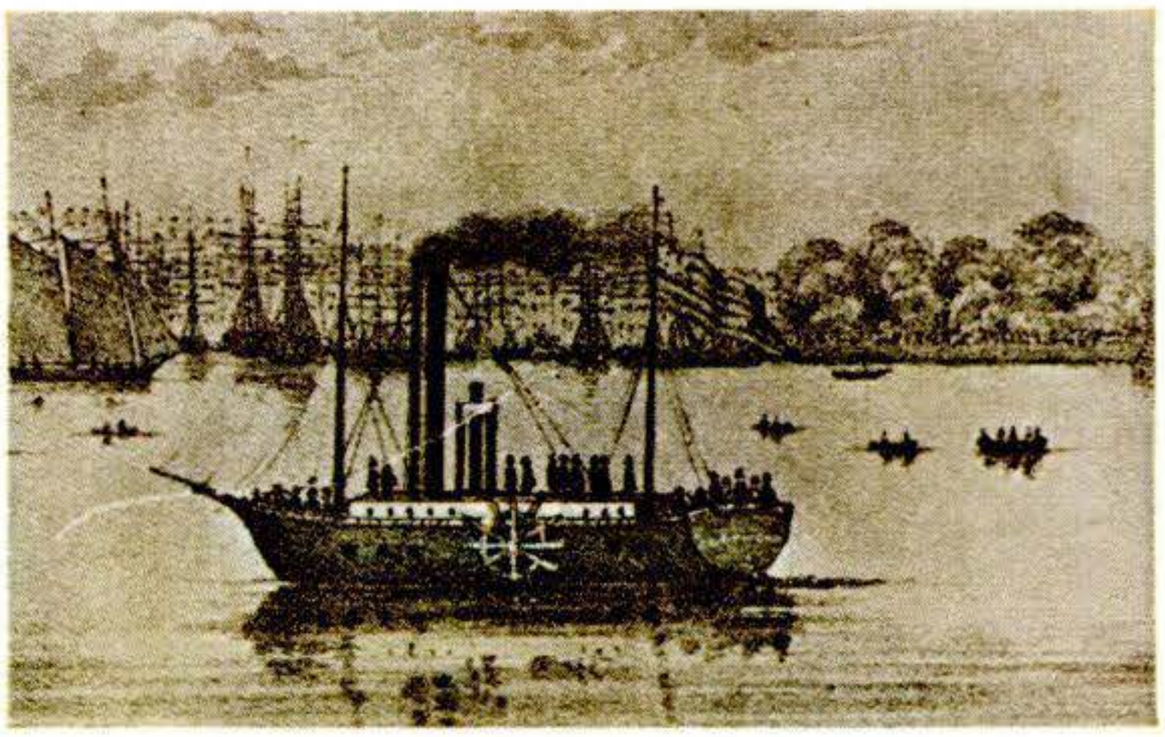
1879. The electric light bulb. It was so dim, people had to use a gas lamp to see it. They laughed.



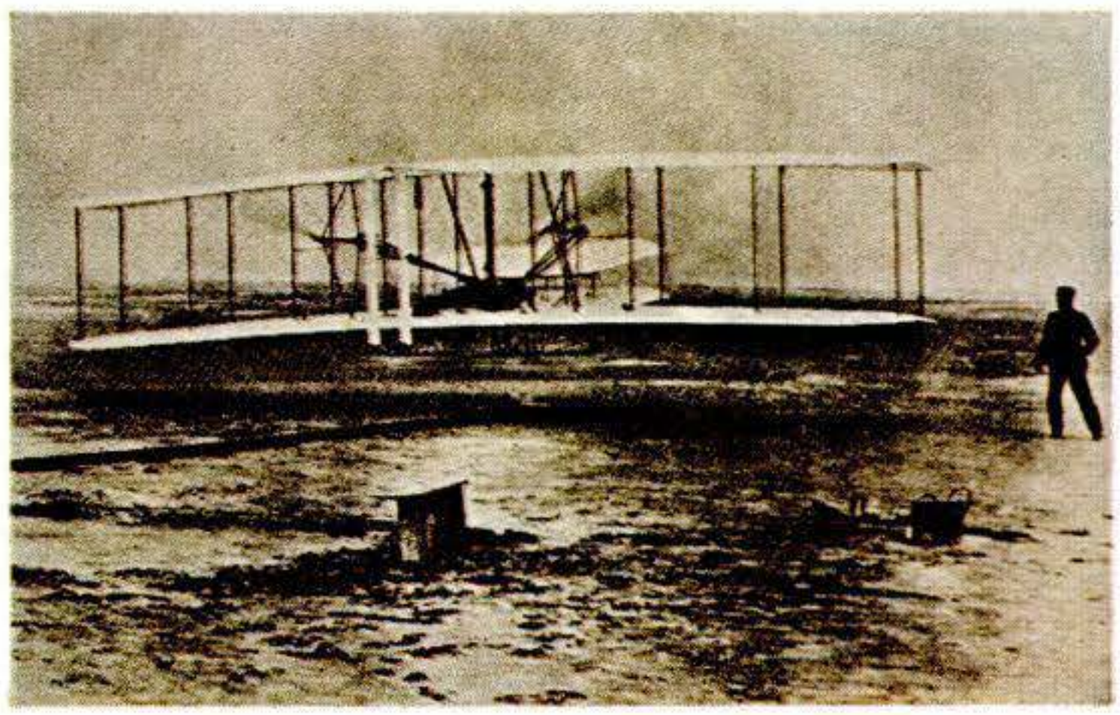
1875. The telephone. Who'd want to stand and talk to a box full of wires? They laughed.



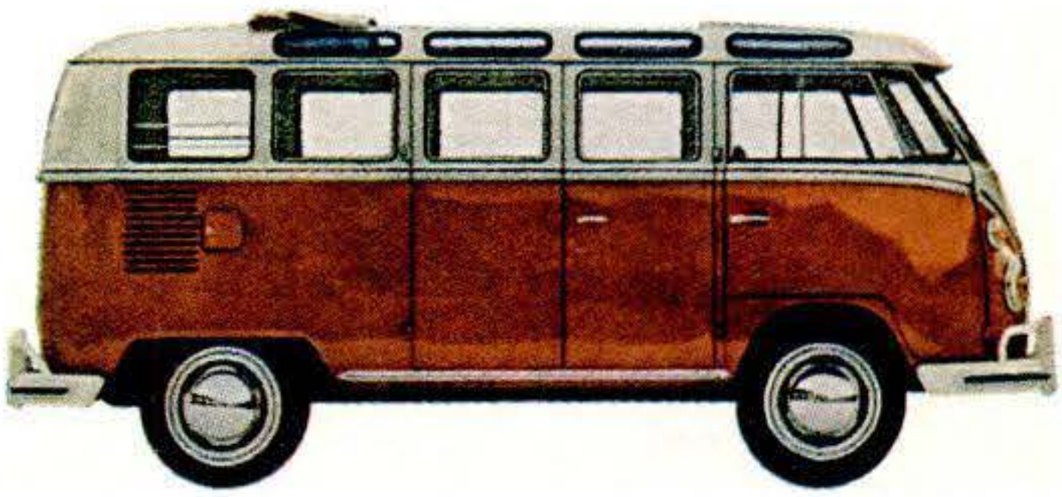
1877. The automobile sputtered down the road. The horse and buggy passed it like it was standing still. And it usually was.



1807. The first steamboat in America made it from New York to Albany in 32 hours. A small boy could've beat it in a rowboat. They laughed.



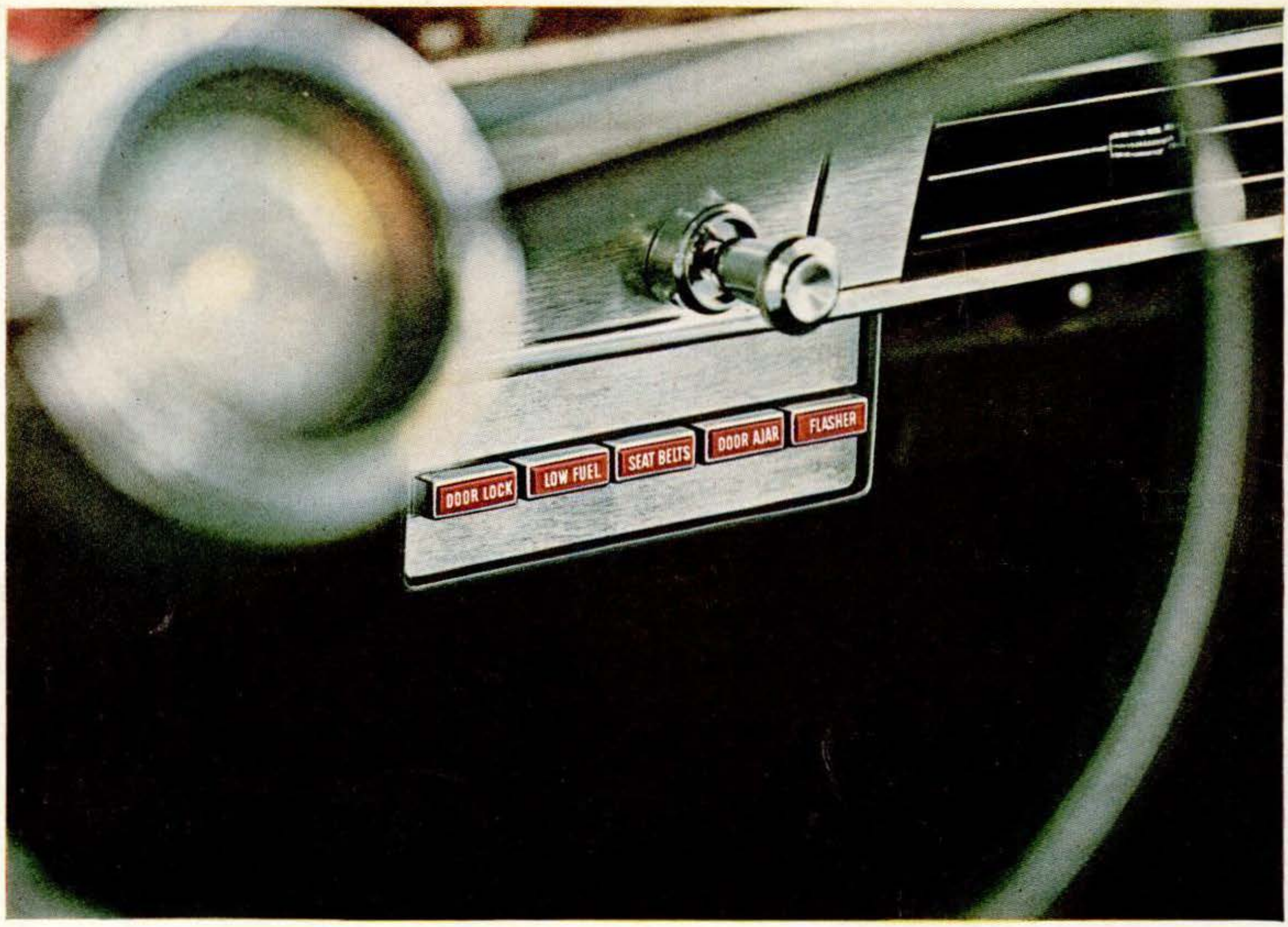
1903. The airplane. Off it soared into the wild blue yonder; down it came 59 seconds later. They laughed.



1950. The Volkswagen Station Wagon. It was square and homely. But it held almost twice as much as un-funny station wagons, took 4 feet less space to park, never froze up or boiled over, and cost about half as much money to run.

The VW is still a pretty funny sight. And people are still laughing. But the laughter is dying down.

Copyrighted material



Data Control Center for drivers

"Fasten seat belts, sir!"

"Roger!"

"Secure all door locks!"

"Roger!"

"Fuel is low, sir!"

"Roger! We'll stop at the first gas station."

You can't always drive with an alert, infallible co-pilot . . . but now Ford offers a practical alternative, a "co-pilot" that goes on duty instantly every time you switch on the ignition. It is Ford's optional Safety-Convenience Control Panel. This miniaturized 2 x 6 inch "data center," jeweled with warning lights and control buttons, mounts immediately to the right of the steering column for high visibility and easy access. What does this automatic control panel do? The first button, on the left, locks or unlocks all doors in a single operation. The second button flashes when the fuel is low. The third button lights up to remind you to fasten your seat belt. The light in the fourth button warns you when a door is ajar, and the fifth button simultaneously flashes front and rear turn signals when you stop for emergency road situations.

Test drive a new Ford, with our automatic co-pilot on board. See if it isn't a tremendous improvement over a back-seat driver.

Ford

AMERICA'S
TOTAL PERFORMANCE CARS

FORD

MUSTANG • FALCON • FAIRLANE
FORD • THUNDERBIRD

Copyrighted material